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Instruction in Industrial Medicine for Medical Students*

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In this age of tremendous achievement and general advancement in all scientific fields, it is regrettable that industrial medicine has consistently fallen behind the other branches of the art and science of healing. Why is it that our best medical schools devote only four or five lecture hours to industrial medicine in a four year course? Why does the worker shun his company's medical department? Why do so few graduates of medical schools choose industrial medicine as a life's work?

It is easy to blame the companies for this laxity in placing industrial medicine in its rightful place, but we should ask ourselves honestly whether we, as physicians, must not share the blame. It is true, that a properly equipped industrial medical department, with the necessary personnel, is expensive to install and maintain, and it is hard to convince a company that this is a good investment when there is no concrete financial return in sight. It is true, that many companies have spent money for preventive measures, but in some cases they have been forced into it by law after a noticeable morbidity in operations; and in others, the high compensation rates for industrial hazards have made changes compulsory. In fewer cases improvements have been carried out through the company's faith in the physician who has been able to persuade them that such measures are not only right, but will ultimately prove to be an economy.

This is not a criticism of the heads of industry, but rather an example of the lack of foresight characteristic of all human nature; and the physician must share the blame for industrial medicine's present role. The physician has been an integral part of every successful company for many years, and it is up to him to make for his profession in industry a place similar to that which it holds in the world at large.

In tracing the history of the physician in industry, we find a gradual evolution, but how slowly this progress has been made and how woefully it falls behind general medical progress. Originally, the physician was called on to take care only of the man who was injured while at work. No questions were raised as to whether or not this worker was physically able to do his job. Later, the

*Read at the Fifty-second Annual Meeting of the Association of American Medical Colleges, held in Richmond, Va., October 27-29, 1941.

doctor stayed on the company property during the heavy shift and could be called for emergencies. Then, with the specialization of modern industry, the training of each worker became an investment of time and money. It, therefore, became imperative that only fit candidates be hired, and preplacement examinations were found to increase the safety of the worker, the safety of his fellow workers and the efficiency of the plant.

Following this trend, progressive companies organized classes in accident prevention, but even this instruction was seldom under the direct guidance of the physician. And now old and new manufacturing processes and materials are studied for possible health hazards as well as those of environmental working conditions.

All of this sounds intelligent, progressive and encouraging. However, the lack of interest with its accompanying effects can well be remembered.

At last, the surgeon in industry is gradually giving place to the medical man as the idea of preventive medicine is supplanting the repair of the damage done. We have come to realize that laws are not passed in anticipation of unfortunate occurrences, but are enacted only after a situation has become antisocial and has been before the public eye long enough to demand penalties for its continued existence. Has the medical man taken advantage of his new opportunity in the change which has taken place? Is it not the fault of the industrial physician that his place is not more important? Is it not we who are to be blamed for the minor place of industrial medicine in the school curriculum? Is it not our fault that the employe lacks confidence in his plant physician?

It is estimated that industry employs 32,000,000 workers in this country at present. This means approximately one-fourth of our total population is spending 24 per cent of its productive life under the possible supervision and guidance of industrial physicians. The field is a tremendous one and its opportunities are constantly enlarging. Why has a challenge of this sort been allowed to go so poorly answered?

Another challenge to the physician in industry is the responsibility being given to lay groups for the conservation of employee health and for employee safety. All important plants have such personnel, and the results of an energetic well trained group of this type have been most beneficial to industry. However, is it not deplorable that successful companies with a low percentage of preventable accidents when asked, "What type of medical care is given the employees in your plant?" so often answer, "Our safety man takes care of that." No mention is made of the physician. The plant physician in many such companies is but a necessary evil, and essential only for caring for injuries occurring to employees on duty and for making routine preplacement examinations.

Is it not lack of proper respect for his job that has pushed many industrial physicians into this secondary place? May not this trend, if permitted to continue, push all into that position in the near future? Certainly, it is not humbling our eminent position as professional men to learn something of the type of hazard the workers must face. Is it not better that the physician investigate conditions

himself and, with adequate engineering assistance, make recommendations to the employer than be told by the personnel or safety group to examine Mr. Jones for a disease after he has been exposed to its cause. I am not against these groups. I am all for them. They are essential to us. We need them and should cooperate and work with them. But I am not convinced that industrial physicians should be in a subordinate position in matters affecting the health and safety of industrial workers.

Most laws concerning employee health and safety are the direct result of action by lay people, often by the worker demanding explanation of hazardous employment and to the installation of safety methods and equipment. The physician has merely followed along and improved his technique when and where it was imperative. This situation is in part due to the great majority of men who when attempting to get started in practice use the salary received for part time industrial work to pay the rent. They are not primarily interested in this field. They have had no training in it, and, as a consequence, are not working wholeheartedly. Thus, they are willing merely to follow instructions. It does not seem fair that industrial medicine should be handled in this manner.

The 1939 report of the National Industrial Conference Board covering medical and health programs of 301 establishments showed that even in the large plants with more than 5,000 workers, physicians were employed part time more frequently than full time; and that in plants with less than 500 employees, members of the medical profession were invariably maintained on a part time or call basis. Since more than 60 per cent of the wage earners in manufacturing establishments are employed in plants of the latter category, it is apparent that the responsibility for their medical service rests most heavily on the general practitioner who devotes a portion of his time to industrial work.

What is to be done to rectify this condition? First, industrial medicine should be emphasized properly, and the importance of its place in medicine and industry outlined clearly. This can be accomplished only by providing sufficiently well trained men in this field. With the present interest evidenced by government, labor and industry in the conservation of man power, no salesmanship would be necessary to place such a group of understanding men. This brings us to the second suggestion. Provide in the modern medical curriculum sufficient teaching on industrial medicine to present its scope and its future. This would allow the student to evaluate this branch of medicine for a future field as he does in choosing obstetrics, surgery and so forth for specialization.

Doctor S. Z. Levine, professor of pediatrics at Cornell, in his opening remarks to the students this year said, "If the physician is to take the leadership in the health program, he must study not only the technique of healing but also such social factors as family income, housing, clothing, nutrition, education and employment." Such preparation, he declared, is either lacking or wholly inadequate in present day medical education.

The field of industrial medicine is too far reaching to be covered in undergraduate years, but certain hours should be given to prepare the student for a

graduate course similar to the training demanded today for a person admitted to the various specialty boards now in existence. Such courses would fit a physician to be called a specialist. If such a curriculum were adopted and companies could secure pretrained men, thoroughly acquainted with the problems to be met and handled, I feel sure they would remunerate them properly and that they would be able to render value received.

Suggestions for instruction in the undergraduate curriculum would incorporate the following ideas:

1. Industrial medicine should be offered to undergraduates as a separate course. By merely referring to disconnected bits of information in various courses throughout the four year curriculum as sufficient instruction in this field, the importance of the subject is lost.

2. The lecture hours should include well chosen topics in a general vein. The scope of industrial medicine, its history and importance, should be presented. Following this introduction, such broad groupings as:

(a) Orientation and general considerations.
(b) Placement of the worker from a physical standpoint.
(c) Routine role of the physician in the plant.
(d) Hazardous occupations, preventive measures and care of employees under these conditions.
(e) General health program for employees.
(f) Research.

3. Field trips should be made to a well organized industrial medical department with demonstration of the above topics in action.

Such a program is entirely feasible if as little as 20 hours were given in any one academic year, but preferably the senior year. The surface of the subject would have been only scratched; but a stimulus for future study in graduate work would have been implanted in some; and the entire class would have been afforded sufficient insight into the subject to respect its importance.

I should like also to urge that much thought be given by you to providing adequate opportunity for graduate teaching in this special field of medicine, comparable to the facilities and training offered in other special fields.

The faculty for both undergraduate and graduate instruction may be gathered very readily in the majority of the communities in which medical schools are located. It has been the experience of most of us in the field of industrial medicine that the time and energy of self trained industrial physicians is available for such teaching. Men for the chemical and engineering phases are likewise readily available.

This presentation has been given as a challenge to you who carry the responsibility of medical education. Let us be able to offer to industry physicians with sufficient knowledge so that they may assume their proper responsibility and status. When these trained men are generally accepted as a necessary part of present day industrial relations, their work will be a bulwark against certain socialistic trends which are constantly appearing on the horizon.

Teaching Industrial Health to Medical Students*

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There have been momentous developments in the field of industrial medicine and health.

Four years ago, the American Medical Association established a Council on Industrial Health. This Council has been very active and has been instrumental in getting a number of the state medical societies interested in the subject. Industrial health committees have been formed in thirty-nine state medical societies. Some of the state medical society committees have put on programs on industrial health for postgraduate medical education and for the benefit of engineers and industrial nurses, too.

The National Association of Manufacturers several years ago organized a Committee on Healthful Working Conditions. This committee has had conferences and round table discussions on industrial health in a number of the large cities in the country. These round tables have been attended by industrialists, plant engineers, physicians in industry, physicians in general practice and industrial nurses. It also has produced literature that has been used to educate industrial management on the value of good medical care, and which teaches them what good medical care involves.

Thirty-one state health departments, two state departments of labor and nine local health departments have bureaus of industrial hygiene. Most of these bureaus were begun within the last five years, and during the last few years have increased their personnel and the effectiveness of their work.

The United States Public Health Service has increased the personnel in its division of industrial hygiene from thirty-three professional employees in 1937 to eighty-eight in 1941. The personnel of this division that are loaned to the state and local bureaus of industrial health grew from 100 in 1937 to 213 in 1941.[1]

There is a National Committee for the Conservation of Man Power in Defense Industries set up by the United States Department of Labor. This Committee has state subdivisions which check on the working conditions in industries that have federal contracts for defense.

The Association of Industrial Physicians and Surgeons has been interested and active in urging its members to do a better job for the health of the employed worker. The president of this Association has recently appointed a committee to outline a course in industrial health for medical students. I recommend the

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1. Townsend, J. G.: Personal communication.

findings of this committee to the Association of American Medical Colleges as a suitable basic course in industrial health to be included in the list of required subjects to be taught in the medical schools of North America.

The American Industrial Hygiene Association has grown in membership and in activities over the last few years.

The Medical Committee of the Committee on National Defense has urged organized medicine to realize the importance of the industrial worker in national defense.

With all the above activity within the different groups named and with an increase of from 50 to 100 per cent in the activities in these groups during the last three or four years one wonders what the American medical colleges have done about the teaching of industrial health. To answer this, a questionnaire containing the following questions was sent to the dean or the professor of preventive medicine in each of the seventy-six four year medical schools in the United States and Canada.

QUESTIONNAIRE

Courses	Lectures (Clock hours)	Number of Field trips	Laboratory Work (Clock hours)	Years Given
Required	.....	.....	.....	.....
Elective	.....	.....	.....	.....

Department or departments in which instruction is given.....

Is there a clinic for industrial diseases which students attend?

Yes..... No..... Hours?.....

Are students accompanied on field trips by members of faculty?.....

Is the medical set-up of the industry visited emphasized?.....

Has the number of hours given to this subject been increased within the last three years?.....

All but two of these schools replied. Fifty-one colleges reported a varying number of hours assigned to teaching industrial health in their schools. Hours assigned ranged from two to thirty. The average was 6.7 hours per school. In a check made by the Council on Industrial Health of the American Medical Association two years ago, fifty-two schools gave an average of just above 5 hours per school.[2]

Twenty-eight of these fifty-one schools took their students on one or more field trips. The average number of field trips for these schools was 2.3. In the Council on Industrial Health's study two years ago, twenty-five schools averaged two trips per school.

Twenty of the schools reported an increase in the hours given to the subject of industrial health in the last three years and one reported a decrease.

Thirty-five of the fifty-one schools teaching industrial health teach it in the department of preventive medicine and public health. In seven of them, it is given in the department of bacteriology and hygiene, and four give it in three

2. Council on Industrial Health; Industrial Medical Education, J.A.M.A. V. 114: No. 7 (Feb. 17), 1940.

or more departments. General medicine and preventive medicine are given credit for the course in two of the schools. One school has a department of industrial hygiene in charge of the teaching, and one school has a division of industrial hygiene within the department of medicine that gives the course. The universities with schools of public health have a large number of hours devoted to electives that the medical students may take, but, as a rule, the required hours given in these schools are given in the department of preventive medicine and the number of required hours averages less than in the medical schools which do not have schools of public health within the university.

Since the Canadian schools do not follow the same system in premedical and medical education that the American medical colleges do, the year in which the course is given, as discussed here, applies only to the forty-three American schools giving definite clock hours for the teaching of industrial medicine.

As to the place in the curriculum where industrial health is taught, two of the schools give the course in the sophomore year, eleven in the junior year, and sixteen in the senior year. Nine of the schools give the course in two or more years of the curriculum. Eight give parts in two years and one starts the course in the last half of the sophomore year, has most of the lectures in the third year, and has two important field trips in the senior year.

Seven of the schools have electives available to undergraduates. In practically all of these cases, the elective is available to only a limited number of students in the class. One of these schools has a clinical clerkship of one month duration as an elective available for eight students in the senior class.

Eight of the schools reported a clinic in industrial hygiene which the students attend sometime during their stay in the school.

Seven of the schools reported laboratory assignments in the required hours, one having as many as eight laboratory sessions. Several additional schools reported elective laboratory hours, but no required hours.

Nineteen schools reported either no definite assignment in teaching industrial health or reported some work done but in no way that we could class it in our tabulations. One of the schools reporting in this group really had some very definite industrial health teaching. Some in this group said they were planning to institute teaching of this subject in the very near future. One school reported the subject as adequately covered in other departments in the regular teaching of the medical and surgical courses. Only one of the Canadian schools reported no industrial health teaching.

Four deans sent the questionnaire to heads of departments in which they felt the subject was being taught, but three of these department heads failed to respond. The fourth responded by saying that he could not answer till he had seen a reprint of a talk I had given last fall.[3] No replies were received from two schools.

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3. Wampler, Fred J.: Teaching Industrial Health to Medical Students, Sou. Med. Jour. V. 34: No. 8 (Aug.), 1941.

Those not having any special time allotted to teaching industrial health write that "the subject is cared for in an integrated manner in the teaching of bacteriology, immunology, public health, internal medicine, surgery, dermatology, ophthalmology and otolaryngology." "Industrial health is not given as a separate course, but as a part of the work offered by departments of hygiene, public health, medicine, surgery and dermatology." "Subject not taught as special topic, but it is included in discussions in all clinical fields, but not independently."

These are rather typical answers from those who do not list any number of hours in the instruction of industrial health. These together with "I regret to inform you that we do not offer any course in industrial hygiene to our medical students" pretty well summarize the replies from the nineteen schools without special teaching in industrial health. Some of those not giving any hours report that they have a clinic for industrial diseases that the students attend.

It would seem from the survey made by the American Medical Association two years ago, referred to above, and from this study that there has been some advance in interest and some increase in the average number of hours assigned to teaching industrial health in medical schools. One gets the impression from the reports, however, that as yet the medical schools are not awake to the fact that they have a golden opportunity to influence favorably the health of many millions of adults. The better medical services in industry are doing excellent work in keeping down industrial sickness. Why should not the men and women now going through medical schools be taught these newer techniques and taught what real opportunities a plant physician has?

Some recent graduates of approved medical schools who were contacted as to the adequacy of their training in industrial medical components are reported in the Journal of the American Medical Association.[2] "The majority feel that while first aid surgery and principles of resuscitation are taught adequately, they are not quite so sure about the commoner industrial health hazards. With respect to industrial toxicology, industrial dermatosis, standards of ventilation and illumination, principles of workmen's compensation and casualty insurance relationships, the majority of recent graduates feel that these subjects are treated inadequately and in that descending order. These replies are a direct commentary on the reliability of contributions to industrial health experience provided by unrelated clinical departments without necessary planning and organization."

One graduate course for industrial managers and engineers in a large city has nine periods of two hours each on industrial hygiene given by one of the best informed physicians on industrial health in the country. I know of a "refresher course" being arranged for young engineers in industry in which a positive medical health program will constitute part of the course. Are engineers more interested in health for the working man and woman than physicians? Is this the explanation for a larger percentage of engineers and safety personnel than physicians attending institutes and symposia on industrial health?

If this is true, is it because teachers in engineering schools are more interested in the health of the employee than are teachers in medical schools?

Is not industrial medicine to most teachers in medical schools first aid and traumatic surgery instead of positive adult health? Are not we teachers of medicine losing an opportunity when we fail to prepare our graduates to think of the health of 32,140,000 industrial workers[4] in the United States? Are we, as physicians, going to turn the nutrition of the worker over to the nutritionist or are we going to direct the work she is to do? The pediatrician directs the nutrition of the infant much to the benefit of the child. Should not the same be true with an adult?

Are we going to turn over to the engineer the full job of protecting the industrial employee from dust, fumes and other chemical hazards or are we going to work with the engineer and see that each individual exposed to an industrial hazard is removed from danger before any pathology can develop? If we choose the latter, then we will not only prevent many early deaths but we will help men and women enjoy more buoyant living.

If our young medical men are to get this vision our teachers of medicine and surgery must get it first. We should become interested in these workers because they are human beings, but if we are not interested in them as individuals, let us take care of them because the health of 32,140,000 workers is vital to National Defense. The slogan of aviation medicine according to a recent movie is "Keep 'em Flying." I propose as a slogan for physicians doing industrial health—"Keep Them Well and Working."

Some of my colleagues have insisted that I tell you something about our industrial health teaching program. So, I shall outline rather briefly what we do.

Since it is easier to take students on field trips in the sophomore year than in later years, we start the course in industrial health in the second semester of that year.

The first lecture covers the history of the development of industrial medicine and industrial health. In another lecture, the governmental activities—federal, state and local—are taken up with emphasis on the state health department work in this field. A third lecture takes up the safety movement—its history, the laws, insurance and compensation. The fourth and fifth lectures cover plant construction, proper location of plants, zoning, plant sanitation, wash room, rest room and toilet facilities, baths with locker space, ventilation—exhaust and other, eating rooms, cafeteria service, and the layout for medical and health services in the industry. Proper lighting, et cetera, is also covered in these two lectures. Field trips, consisting of from about one hour and one-half to two hours and one-half each, are taken in this year to the American Tobacco Com-

4. From the Monthly Labor Review for August, 1941, p. 532: Excludes military and naval forces as well as employees on WPA and NYA projects, and enrollees in CCC camps. Also excluded proprietors, firm members, self employed persons, casual workers, and domestic servants. No agricultural workers are included.

pany, the American Can Company, a foundry and rolling mill, the state penitentiary—where we see the manufacturing program as well as the housing and sanitation side of a prison, a large paper mill, and a packing plant—which serves the double purpose of showing some food sanitation as well as an industrial program.

In the second half of the junior year, along with other phases of preventive medicine, lectures cover silicosis, volatile solvents, lead poisoning, three lectures on the principles of industrial toxicology, fatigue, nutrition, industrial compensation and administration of a medical program for a nation wide industry. Thus, we have five lectures in the last part of the sophomore year and ten lectures in the last half of the junior year.

In addition, syphilis and tuberculosis in industry are covered in lectures on the preventive programs for both of those subjects, although we have never counted them in as part of the industrial health teaching.

In the senior year, when we take our students in small sections on rather important field trips in preventive medicine, we have two trips in industrial health, one trip to the State Health Department's bureau of industrial health, where all kinds of equipment for making plant surveys are demonstrated, and one afternoon is spent in a very well organized medical setup in an industrial plant.

In addition to this work, required of all the students, we have an industrial health clerkship available for eight of our senior students where they can spend four weeks in the medical departments of several large chemical plants, together with toxicological research laboratories and a medical office that controls a nation wide industrial medical service.

In some ways, it is unfortunate that we have to spread the teaching of industrial health out over these three years. We do this because lecture work is out of the question in the senior year, because so many of the students are off the campus entirely, or they are on some necessary clinical subjects, like the outside obstetrical service, the surgery service, or are away on some elective. It has the advantage, on the other hand, of starting them to thinking on the subject early in their clinical experience and giving them a taste of it as they go along.

I have hopes of developing a service in both the clinic and the hospital which will make our teaching of this subject much more effective than it is now. To me industrial health is adult health. It is the best single way to get over to the medical student the fact that you can do something to guard the health of adults in general as well as the health of pregnant women.

The objective of industrial health is well expressed in two sentences; "The adjustment of the working environment to the employee," and "The adjustment of the employee to the working environment—including also the human environment." The attainment of the first of these is the combined duty of the safety engineer and the physician. The attainment of the second is the sole responsibility of the physician. Let us train our graduates that they may measure up to the task.

DISCUSSION ON PAPERS OF DRS. HAZLETT AND WAMPLER

DR. E. S. RYERSON (University of Toronto Faculty of Medicine): I want to congratulate both the readers for having presented the relationship of health to industry. But health does not only relate to industry. Dr. Wampler has referred to its much broader conception. Four years ago, at San Francisco, I suggested that the medical curriculum should consist of one in which the students in the preclinical years should learn about not only anatomy and physiology and the preclinical sciences, but their application in the human being in relationship to the degree of health he had, and in accordance with that degree, how that health could be promoted.

It may be of interest to follow the development of this idea since that time. At many of the meetings I have attended where this suggestion has been discussed, my own personal experience has been that the hardest people to get to talk about health are doctors. I can't interest a doctor in talking about health for much longer than five minutes. He then begins to tell me about some case he had; about this or that or the other thing that he is reminded of in talking about health. That is no criticism. I was exactly the same before I began working in this particular field, and that is why I think that we have to get down to the fundamental basis of health and its relationship to medical education.

Our whole medical education, from all the ages up to the present time, has been focused upon learning about disease and sickness and the sick person. Our fundamental sciences are spoken of as preclinical sciences; they are preparation for application to the sick person and not in relationship to the well person.

At one of the meetings in Chicago when I was discussing this, and giving some of my ideas about health, Dr. Ray Lyman Wilbur of Stanford University said, "Ryerson, what is health?" Unfortunately, our attitude as the result of our training has resulted in our thinking of health as merely the freedom from or absence of disease. I have heard it suggested that there is no such thing as a periodic health examination, that every thorough examination that a patient has is a health examination. I claim that that is not the case. Our approach, which is one of the greatest advances, in my mind, in the practice of medicine in the last thirty years, has been the introduction of the scientific method of the study of the sick person, in which we take his history, examine him, do the laboratory, X-ray and every other possible investigation, correlate these and apply them to the solution of our problem of diagnosis, prognosis and treatment.

That, to my mind, is the application of the scientific method to the diagnosis of the sick person. I think that same principle can be applied to the study of the well person, but in order to do so one must have a fundamental conception of what positive health is. As the result of Dr. Wilbur's question, I went home to try to solve that problem and come to a realization of what individual positive health was.

The first thing that came to my mind was that health is something that occurs in living things only and not in nonliving things, and if it occurs in living things, one naturally goes to the simplest form of living thing to see if one can obtain an idea fundamentally of what health is.

I had the good fortune to see a moving picture of Professor Robert Chambers, of New York University, of the living amoeba, and any of you who have not seen a moving picture of that kind have no realization of the thrill that you get from seeing actual life going on in the living organism. This shows the amoeba on the screen about the size of a saucer, showing the four (as we recognize them) biological characteristics of life: movement, as it moves about in the medium and as the protoplasm moves and the particles in the nucleus are seen moving about; it moves about and shows the primary factor with reference to living things—movement which comes into our whole human life in relationship to all forms of physical activity.

The second is that of taking in material from without, digesting it, assimilating it, excreting the waste; the whole question of metabolism and nutrition which is applied

in the field of nutritional science. Surgeon General Parran recently remarked in speaking of nutritional science that it stands today where bacteriology stood in 1900 and that there is every possibility of the same progress in it as there has been in bacteriology.

The third characteristic of life is that of response to stimuli. You see this amoeba moving about, moving toward certain objects and taking them in, moving away from others, which in the human is illustrated by our sensory nervous system, and also by mental and emotional reactions.

The most exciting thing was to see the nucleus in this moving picture jumping about with some degree of activity, divide into two parts, and then the whole cell divide, and here you see life actually being produced before your eyes: in other words, reproduction, but not only reproduction—that goes on through the various periods of life, that is to say, growth, development, and finally death, death being a sign of life. Only living things die, obviously.

With those four characteristics of life, what is your fundamental conception of health? If the quality of the organism is of a high degree and if all of those four functions are performing and carrying out their functions efficiently in themselves and harmoniously with one another in the environment in which they live, then we have a fundamental conception of health.

With the definite idea of positive health in mind, the study of the living organism from this new point of view has been both interesting and enjoyable. Out of it there has developed, as the result of a pure coincidence, the opportunity to introduce this point of view in a course in Physical and Health Education at Toronto. I have realized that the introduction of this approach into medical education and medical practice is going to be a long slow process, because of the nature of the training that we have had and of our real interest in sick people. I am looking into the future and the graduates that are to come, hoping that we can improve their point of view with regard to health.

I feel that if a fundamental conception of the healthy living person could be given to students in the preclinical part of the medical course, then the actual amount of time that would need to be devoted to industrial hygiene as a specialty would be relatively small, for the students would know the principles of maintaining and promoting the health of all citizens and therefore be capable of looking after the industrial worker.

It is not only 40,000,000 people in this country that can be helped but 130,000,000 people that might have something done to promote and improve their health, and the only way that can be done is by educating every individual. Each individual is responsible for his own health. We have to begin with the child and give him a fundamental education. The educationists have recognized positive health, for it is the first objective of primary education, not only in this country, but in Great Britain and in Canada. In all of the public schools it is put down as the first objective, and still when they come to carry that through, they have a manual with a lot of dogma and drill and precepts that are laid down with no fundamental background to them whatsoever. In our younger days it was largely the avoidance of whiskey and smoking and such things of that sort.

In order to provide health education not only for the child in the primary schools, but to continue this up through all grades in the secondary schools, so that the pupils may have the same scientific knowledge of health as they have of chemistry or mathematics, teachers must be given a university training in health.

Two years ago I was invited to a University Committee meeting to consider the establishment of a course in Physical Education for Men, one for women students having existed for many years. I had no conception of what physical education courses consisted, I am sorry to say, nor had I any idea of the many contributions made by physical educationists on the effects of physical activity upon the health of the body. Some of you may be interested in one of their books about which I have found most medical men have never heard, namely, "The Physiology of Muscular Activity" by

E. C. Schneider (W. B. Saunders Co.). It contains much valuable material and the reports on an enormous amount of research work in this field.

When I went to this committee and heard this discussion, the idea occurred to me: Why not utilize the suggestions I made with reference to the medical course, i.e., combine the two first years of the medical course with the course in physical education and replace what the physical education course is now? Physical education courses in your country, and our own, have consisted of one-third in physical education and the other two-thirds being made up of various arts subjects. The teacher then may teach this, that and the other courses in the schools according to which ones were taken in the physical education course.

In place of this usual arrangement in Physical Education courses, my suggestion to combine Health Education with Physical Education was approved and we established last year at the University of Toronto, a three year course in Physical and Health Education leading to the degree, Bachelor of Physical and Health Education (B.P.H.E.). In this course, the first year is very much like our first year in Medicine (it corresponds to the second year premedical in your schools in the U. S.); one-third of the curriculum is devoted to Physical Education, both theoretical and practical, and the other two-thirds are almost identical with the second and third years in Medicine (the first and second years of your course omitting Pathology and Physical Diagnosis). Instead of Anatomy and Physiology, these subjects are called Functional Anatomy and Applied Physiology, because they are taught from the standpoint of the living person and not simply as the subjects with these names. The courses are so arranged as to be taught concurrently. The body is built up from its simplest units instead of taking it to pieces. The students do no dissection, but they will have dissected parts and subjects demonstrated to them. The course begins with the single living cell, the blood and the single capillary. From this, the course of the blood circulation is followed, dealing with the veins and the heart, which is the first organ the student studies along with the general circulation of the blood. Next he learns about the lungs and respiration. Then he follows the arterial circulation to the structures in the extremities and trunk and is taught the Physiology of exercise.

In the third year, the final one of the course, he studies the abdomen and its viscera and nutrition and metabolism; then the nervous system and special senses, including the intellect and emotions and mental hygiene. He ends by studying all of the age periods of life, beginning with embryology and infancy, childhood, adolescence, maturity and finally old age. The preservation of health by preventing diseases is also included in the course.

This conception of health as a positive entity, in which there is a consideration of the quality of structure and of efficiency of function, which can be assessed by a health history taken from the standpoint of how healthy the person has been all his life and not how much sickness he has had, enables one to decide what can be done to promote the person's health. We have, obviously, three very definite ways in which we can improve health: physical activity, nutrition and mental hygiene. It has occurred to me that the conception of health from all these standpoints by the scientific method needs a name. One might think possibly of the hybrid word healthology, but this would not be approved by the language purist, so I have suggested that we take the word hygiea and add "logy" to it, so we have Hygiealogy as a name for the science of health. I think if we begin to think of health in this sense and adjust our medical courses to this point of view, we may hope to convince our Departments of Anatomy to revise their approach in teaching this subject. Our Departments of Physiology are not difficult to convince because they are doing a great deal of teaching of normal function, although they are not summing up the many details and applying them to the individual as a total organism. As the result of teaching in this new course we hope they will do so. The teachers in the Department of Anatomy are having a great deal of enjoyment from looking at anatomy from this other point of view, and I think after our Departments of Anatomy and Physiology have been teaching from this point of view for a few years,

they will be able to report upon it and write books upon this approach to the teaching of anatomy and physiology, and perhaps the medical students in the future will learn what health is, fundamentally, and therefore practice health as well as disease.

DR. W. S. LEATHERS (Vanderbilt University Medical School): There is no question about the importance of industrial medicine or industrial hygiene. This does not require any argument at the present time especially when there are so many people engaged in industry. But I think the question is particularly: In what way can we lead the students into this avenue of service? I am becoming increasingly conservative relative to pushing back into the undergraduate medical instruction these various special interests. I think the fundamental thing in medical education is training the doctor, the undergraduate, in the basic subjects of medicine first, and not to encumber his thinking too much by adding a lot of short courses relative to the interest which different persons may have relative to the trends in medical education. I think we ought to keep our feet pretty firmly on the ground in this respect.

The chief thing, it seems to me, in regard to industrial medicine, relative to medical students, undergraduate students, is to use those methods more or less in the curriculum which will at least direct his interest, if he has an interest in this particular phase of work. It is obviously undesirable to require a considerable number of hours of all students, many of whom may not be interested in industrial medicine. After all, industrial medicine includes curative as well as preventive medicine, and if we give a good course in preventive medicine, the medical student can apply that knowledge to industrial medicine just as he can to other phases of work. I think a fundamental weakness in medical education today is that there are not enough schools giving the basic training in preventive medicine. The question of ventilation, the control of communicable diseases and such subjects rightly belong to a course in preventive medicine. I am perfectly aware of the importance of taking students out and showing them something about the medical and hygienic aspects of industry, but in doing so they should not be junket trips. It should be done very carefully. You can waste time this way and instead of impressing the student, he becomes reactionary; so we ought to think pretty carefully as to the kind of work we give students relative to matters of this kind. They ought to get something out of it.

I think these papers are interesting and valuable. The authors have brought before us a subject of much importance and I am sure you are giving thought to the special needs in medical education, particularly with reference to National Defense. I wish to conclude my remarks by again emphasizing industrial hygiene or medicine as an important phase of medical teaching. Personally, I think that this subject is a specialty which should be dealt with as such in the curriculum. It may be of interest to state that the Committee on Professional Education of the American Public Health Association at a recent meeting adopted qualifications for those who wish to specialize in industrial hygiene. If a medical student wishes to adopt this phase of medical practice as a career, he should take additional training as a graduate student.

DR. SARAH MORRIS (Woman's Medical College): As an undergraduate teacher who has been teaching a course in industrial hygiene as part of the Department of Preventive Medicine for the last ten years, I want to say it can be done. I wish to testify to that. The preceding speakers have referred to the great number of industrially employed and what has been done in larger industries, but a great many of our smaller industries, where they have no medical service, still must depend on the general practitioner, and many of them are very uninformed.

In any plan which has been presented for rectifying the conditions as we find them in industry and putting them on a better plane, the lack of training and experience of the average physician and the dearth of well trained industrial physicians is the weak point, or the weak link in the chain, if you wish to speak of it that way. Therefore, in introducing a course, which need not be an elaborate course in the undergraduate school, we

not only teach the general practitioners of the future some of the fundamentals but some of the things which they are going to have to meet in their practice in an industrial world in which we now live, and which is becoming more and more complex as industry adapts to its own use the very rapid scientific development in all fields.

We, as physicians, have not kept pace with the scientific development in various fields as industry has applied it; we have not adapted the medical sciences to meet the risks which these things present; and these papers, I think, are a challenge to us as medical educators to join with industry and with government, which now is taking over the medical direction, just as the engineer and others have taken over medical direction of things which ought to be in the hands of the medical profession. If we join with them in directing those medical aspects, I think we have taken a step in the right direction.

There is no doubt that many things can be introduced as little "me too's" in different parts of our medical curriculum, but if we do not orient it, if we do not present it to the undergraduate medical students as an entity, we do not instill in them a desire to go on into this special field. Surgery is a specialty, Gynecology and many other subjects are specialties, but we introduce them. We do not expect to make specialists in those fields in the undergraduate years, but we do give students an inkling. We do give them an incentive to go on into the graduate fields.

I think that medicine has been presented with a challenge. Because we have not met our responsibilities, the industrialists have necessarily taken on themselves the medical direction of things that ought to be in the hands of the medical profession. They have turned to the engineer, to the social service worker, and now they are turning to the Government. Why do not they turn to us? Because we are not there. We are not trained. We do not have enough trained physicians in this field. Therefore, we must introduce a simple, well correlated, well integrated course into the undergraduate school, which I can testify can be done in the minimum of twenty hours, including the basic talks which Dr. Wampler has outlined, and some field trips which are by no means entertainment trips. Our students come back well informed. We have them report on these trips. We have seminar discussions. We have the industrialists join us in those discussions, and we get experts in from outside to teach us the more technical things. But in medicine, we should emphasize the medical aspects of this, leaving the highly technical aspects for the engineer and the chemist and the physicist.

Certainly, there are many medical facts which can be introduced into our curriculum and done successfully and practically as part of this course. We have been able to place women physicians in industry after they have had an incentive from this course to go on and study and become proficient. We have placed them in industrial laboratories where they are doing scientific work. It can be done. This committee has prepared a very practical, simple undergraduate course, and I hope that this Association will consider it very carefully before abandoning it. The total plan is not a simple one. It is a plan for continued work. This is a stepping stone. It should go on to an elective course in undergraduate schools for those who want to go into industry later, and for graduate courses, with refresher courses for those already in the field, and for more complete training under the regulations which will probably come out of the specialty boards later for this particular field. It is a long range plan. It is a challenge. The industrialists and the workers and the government have all found that it pays to take care of the health of the worker, but they are not anxious to have the doctor step in only after things have happened, after they come before the compensation boards; after the accidents have occurred, after the advanced occupational diseases have developed. They want us to help them in solving the medical problems of industry; which will prevent, which will control and which will minimize conditions before they get into the courts, and I think it deserves very serious consideration.

DR. RYERSON: I omitted to say that we are also doing something for the doctors of the present day to instruct them in industrial hygiene. I have an outline of a diploma course in industrial hygiene which is being introduced in Toronto in the immediate future which I will gladly give any one who is interested in this subject.

Preliminary Report of the Committee on the Teaching of Public Health and Preventive Medicine Association of American Medical Colleges

This committee was appointed by the Association of American Medical Colleges at its annual meeting in 1939. The purpose of the committee is best expressed in a letter from the Secretary of the Association to the Chairman of the Committee under date of November 1, 1939, as follows:

"Pursuant to the request of the American Public Health Association that this Association appoint a committee to cooperate in formulating a program for the education of undergraduate medical students in preventive medicine and public health, the Executive Council of the Association of American Medical Colleges has appointed the following committee: Dr. Harry S. Mustard, New York University; Dr. John E. Gordon, Harvard University; and Dr. Chas. E. Smith, Stanford University."

In a subsequent letter, December 2, 1939, the Secretary of the Association advised the Chairman as follows: "Another matter which we would like to have your committee consider is the multiplicity of degrees in public health granted by many universities."

Not long after the appointment of the committee, Dr. Gordon went to London to serve with the Harvard Red Cross Public Health Unit, and it was possible for him to participate in the committee's deliberations only in their early stages. In view of this and because of certain independent research which Dr. Hugh Leavell, Professor of Public Health, School of Medicine, University of Louisville, had recently completed in the field of teaching of preventive medicine and public health in medical schools, Dr. Leavell was added to the committee in 1940.

This committee will in due course submit a comprehensive report of its work, with details as to its findings; and, in general, will present a more exhaustive and documented treatment of the subject under discussion. In the meantime, as a matter of record and pending further conference with the Committee on Professional Education of the American Public Health Association, there is submitted below a summary of conclusions as to the present situation in regard to the teaching of preventive medicine and public health in medical colleges. Submitted also are recommendations which, if adopted and put into effect, should improve the existing situation. It is requested that the Executive Council of the Association approve these recommendations in principle, in order that the Committee may proceed further in its conferences with the Committee on Professional Education of the American Public Health Association.*

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*The recommendations were approved, the committee was continued to report next year. It was decided that the final report of the committee be made a topic for discussion at the 1942 meeting of the Association of American Medical Colleges.

Recognizing, as it does, the danger of blurring essentials by too extended consideration of details, the committee believes that the purpose of this summary report will best be served by presenting short, numbered paragraphs, setting forth its conclusions and recommendations. These follow.

FINDINGS AND CONCLUSIONS AS TO THE PRESENT STATUS OF TEACHING PREVENTIVE MEDICINE AND PUBLIC HEALTH TO MEDICAL STUDENTS IN AMERICAN MEDICAL COLLEGES.

These findings and conclusions rest upon three principal sources of material: (1) replies received to a simple questionnaire sent by the committee to medical colleges; (2) previous studies, reports, and papers on the subject under discussion, and (3) information possessed and opinions held by individual members of the committee.

1. There exists a wide diversity of opinion and some confusion as to what should be included in a course of preventive medicine and public health in a college of medicine. This disagreement is exemplified in the answers received to questionnaires, in letters that accompanied these returned questionnaires, and by information received from other sources. It is believed that these diverse practices and opinions arise from a number of causes, among which the following appear to be important.

(a) Compared to other subjects taught in a medical college, the attempt to provide a course in preventive medicine and public health is a new undertaking. Facing an already overcrowded and not entirely elastic curriculum, proponents of preventive medicine and public health have been forced to insinuate it into the teaching schedule in an opportunistic rather than a systematic manner. This, naturally, has resulted in a wide divergence in the content, scope and arrangement of such courses.

(b) Necessities and opportunities in the various medical schools, and in their respective adjacent facilities, have to no small extent shaped the patterns of courses in this subject. Of definite influence have been such factors as local health problems incident to geography, auxiliary facilities of nearby health agencies, the competence and interest of local health officials in teaching, the number of students, the attitude of the medical school faculty and financial considerations.

(c) Naturally, there is a tendency on the part of deans and professors responsible for a given course in preventive medicine and public health to defend the soundness of its content and arrangement. If one does not teach, say, parasitology, as a part of preventive medicine and public health, then it is not essential; if one does provide this as part of the course, then he is inclined to consider it an essential part.

(d) Discussions and decisions by those interested in this subject have been unsatisfactory because some use the terms "preventive medicine" and "public health" synonymously, others do not.

2. Not through questionnaires, but on the basis of impression and experience, the committee believes that deans and faculties of medical schools, though, in general, professing to consider it essential to provide sound instruction in preventive medicine and public health, do not actually regard this subject as important. The committee's belief is, to some extent, substantiated by the fact that in the volume, Medical Education in the United States,[1] where there is a pattern map for evaluation of two contrasting schools of medicine, there is no reference to preventive medicine and public health. The attitude of faculties is shared by students. It is possible that students only reflect what they sense as faculty feeling; it is also possible that the character of instruction in preventive medicine and public health ordinarily provided has not merited any greater respect than it has had from faculties and students.

3. From a study of the time of day and the days of the week assigned for teaching of preventive medicine and public health in the various medical college schedules, it would seem justified to believe that in many instances the hours provided are those which no one else particularly wants.

4. Without going into detail, it may be said that the general tendency in the past has been to provide instruction in preventive medicine and public health only in the last two years of medical education, and in many instances only in the last year. Recently, there has been an inclination to begin this instruction in the second year, occasionally in the first, continuing systematically throughout the four years of medical education.

5. A common experience of teachers of preventive medicine is that the interest of third and fourth year students is at a minimum unless they have had previous instruction in this subject. The reasons for this appear to be somewhat as follows: The student has by this time focused his interest, quite exclusively, on the pathology, diagnosis and treatment of the frankly sick individual; having had no basic courses which lead up to preventive medicine and public health, as the preclinical subjects lead up to the clinical, he is inclined to regard this new instruction dealing with prevention and the mass phenomena of disease as something foreign to medical education and his future profession; further, when instruction is begun in the last part of the four year course it is likely to be superficial and didactic.

6. The character of instruction naturally varies within wide limits. There is a strong tendency to dispose of the matter of instruction in preventive medicine and public health by the provision of a series of lectures, though many schools have instituted some sort of field instruction where groups of students visit bureaus of the health department, sewage and water plants, pasteurizing plants, industries, etc. An increasing number of medical schools are effecting cooperative relationships with local health departments and voluntary agencies, and through this arrangement provide observation, occasionally participation, on a modified clinical clerkship basis.

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1. Medical Education in the United States, 1934-1939: Council on Medical Education and Hospitals of the American Medical Association, Chicago, The American Medical Association. 1940.

7. The organization within medical schools for providing instruction in preventive medicine and public health falls into three principal categories, as follows: Full time departments, combined departments, separate but not full time. In addition a few must be carried as unorganized or unclassifiable.*

(a) *Full Time Departments.*—The increase in the number of full time departments of preventive medicine and public health is striking. FitzGerald, in 1935-1936, classified twenty-four medical schools, eighteen in the United States and six in Canada, as having such departments. The data obtained by the present committee indicate that there are now thirty-two full time departments devoted to this subject: twenty-seven in the United States, five in Canada.**

(b) *Combined Departments.*—The committee's data, supplemented by catalog statements, indicate that in twenty-five medical schools in the United States, and one in Canada, instruction in preventive medicine and public health is carried on in combination with the teaching of other subjects, most frequently bacteriology. In such combinations, preventive medicine and public health is usually the minor interest.

(c) *Separate, but not Full Time Departments.*—As nearly as can be determined, there are ten schools in the United States and three in Canada which have separate departments of preventive medicine and public health, but the personnel is essentially part time. In nine instances the head of the department is the local health officer.

Seven schools appear to have arrangements which are unusual and not classifiable under any one of the above categories.

8. The committee is of the opinion that the better courses in preventive medicine and public health are to be found in those medical schools which provide a separate department for teaching and research in these subjects and where the department head and most of his assistants are on a full time basis. It does not, however, follow that the part time head of a department is unsatisfactory for there appear to be good departments operated on this basis.

9. The committee senses a tendency in instructors in preventive medicine and public health to visualize students as future health officers rather than as private practitioners of medicine, interested and informed but not specializing in this subject.

10. There is as much variation in the number of hours assigned to the teaching of this subject as there is in the content. A few schools provide no instruction at all in preventive medicine and public health, as such, while a few others provide more than 200 hours. The median number of clock hours is eighty-two.[2]

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*In classifying schools, because of a number of borderline situations, it has been necessary to make certain arbitrary allocations.

**Reviewed by Dr. C. E. Smith, who participated in the FitzGerald study and is a member of this committee. In evaluating the data gathered by this committee, Dr. Smith observed the same criteria utilized in the FitzGerald study. The change in the Canadian allocation is not the result of actual alteration in the organization of the Faculty in question but is due to the reply of that Faculty to the present questionnaire.

2. Leavell, H. R.: Teaching Preventive Medicine to Medical Students, New York, The Commonwealth Fund, 1941.

Compared to the total number of hours available in the whole medical school curriculum, this represents 1.9 per cent as against 4 per cent advocated by the American Medical Association and the Association of American Medical Colleges. Few medical schools appear to reach this recommended goal.

11. Among schools of medicine the median annual amount available for teaching preventive medicine and public health is $5,700.[2] When this median figure ($5,700) is placed against $167,485,[1] which is the median of the total annual costs of instruction in sixty-six four-year medical schools,[1] it is found that the cost of teaching preventive medicine and public health represents 3.4 per cent of total costs. For obvious reasons, such a figure must be accepted with caution.

RECOMMENDATIONS WHICH THE COMMITTEE ASKS THE EXECUTIVE COUNCIL TO APPROVE IN PRINCIPLE.

In submitting these recommendations, the committee has avoided setting up any fixed quantitative standards. It does not believe that a uniform detailed schedule as to content of courses, sequence of instruction, or budget would be practicable or acceptable in all medical schools. The committee does, however, believe that if this Association gives its support to the general principles and objectives set forth below, there will follow a natural, sound and permanent growth of this phase of medical education. Further, the committee recognizes that in undergraduate instruction in preventive medicine and public health, there are many goals and desiderata which cannot be covered by recommendations or standards. Reference here is made to such intangibles as personality, leadership, cultural background and the scholarly and scientific attitude desirable in those who are to be made responsible for teaching in this field. Given these things in a department head, a paucity in hours of teaching time would be overcome; lacking most of these qualities, the instruction and stimulation offered would be mediocre even though an abundance of teaching hours were available. Finally, although no specific recommendations are submitted as to provision of research facilities in a department of preventive medicine and public health, and although this committee was commissioned only as to the teaching aspect of this subject, it nevertheless seems pertinent to emphasize that in this, as in any university department, dry rot is likely to develop in the absence of scientific curiosity and time and facilities to gratify it.

Specifically, the Committee Recommends.

1. That, as a necessary preliminary to clear thinking and further discussion, a sharp distinction be made and maintained between the two terms "preventive medicine" and "public health."

2. That "preventive medicine" be regarded as that body of knowledge and those practices believed to contribute to the maintenance of health and the prevention of disease in either the individual or the aggregate; and that "public health" be regarded as that body of knowledge and those practices believed to contribute to health in the aggregate, either through preventive or corrective measures or both.

3. That it be accepted that the objective of instruction in preventive medicine is to provide for medical students a thorough education in those principles, and skill in those practices, through which as physicians they may contribute to the maintenance of health and prevention of disease in their patients.

4. That although in varying degrees in the several departments of the medical school there is opportunity to provide instruction in preventive medicine, and that such opportunities should be developed to the maximum, it is, nevertheless, essential to provide additional over-all and coordinating instruction in this phase of medical education through one department specifically designated for this purpose.

5. That it be accepted that the objective of courses in public health is to ensure in medical students an interest in the maintenance of health in the public, an appreciation of the natural history of disease as a mass phenomenon, and to establish in these undergraduate students a knowledge, not only of the way in which social, economic and political forces operate in public health, but an understanding of the degree and manner in which these factors determine the character and extent of public health practice.

6. That, regardless of extremes of radical and conservative opinion as to how the future of medicine may best be shaped, it be recognized that the demands of an enlarging public medical service, under one arrangement or another, will draw a much greater proportion of physicians than heretofore into government employment, on full time, part time, or fee basis, thus making them increasingly responsible for participating in organized preventive and corrective measures in the interest of the public health.

7. That because the problems and practices of public health, as defined above, are determined by an interplay of biologic, social, economic and, in the broad sense, political forces, and because an understanding of the latter three factors in their interrelations with health and disease is not provided in the conventional medical curriculum, instruction in this phase of medical education may best be ensured by a separate department, staffed and equipped for this purpose; and that as a preliminary to a proper concept of disease as a mass phenomenon, the teaching schedule of such a department should include biostatistics and epidemiology.*

8. That instruction by the department of preventive medicine and public health begin not later than the second year of medical education, preferably the first; that it continue as part of each succeeding year of medical education; and that the character of instruction be such as to provide a broad perspective and a sound understanding of the problems and principles involved rather than transient information as to details.

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*A sound knowledge of statistical concepts and methods is absolutely essential for an understanding of public health problems and practices. The committee believes that such a grounding in biostatistics would be a great advantage to students in other aspects of medicine and research. It would be ideal if students could enter medical school already equipped along these lines, but the committee recognizes that it would be difficult to add biostatistics as a requirement in premedical education and doubts that such a highly specialized subject would be well taught in all colleges where premedical work is done. For these reasons, it is recommended that the subject of biostatistics be included in the medical curriculum.

9. That because preventive medicine finds wide application in public health work, the necessary over-all and coordinating instruction in preventive medicine, referred to previously, be provided through the teaching department responsible for instruction in public health.**

10. That it be recognized that qualifications for productive teaching in public health or for instruction in the mass aspects of preventive medicine are not likely to be acquired through training and experience in some other field of medicine, or to arise naturally as part of the aging process.

11. That although it is entirely possible, in view of individual competence and personality, to utilize the part time services of a health officer to direct a teaching department of public health, this should not be regarded as a desirable procedure in ordinary circumstances.

12. That there continue in force the previously accepted standard of this Association, which sets aside for the teaching schedule of the department of preventive medicine and public health, 4 per cent of total curriculum hours available; that because in teaching preventive medicine and public health only minor use may be made of low salaried assistants and instructors, the budget for such a department should range from 5 to 8 per cent of the total instruction budget of the medical school.

Respectfully submitted,

(Signed) H. S. MUSTARD, *Chairman*
HUGH R. LEAVELL
CHARLES E. SMITH

Dr. John E. Gordon, a member of the Committee, is at present in England. He, therefore, has not seen this report.

**The committee regards it as undesirable to limit the designation of this department to "preventive medicine." Such a limiting designation would tend to perpetuate the mistaken and confusing concept that preventive medicine and public health are identical.

Who Teaches Anatomy Anyhow?

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And the readers, if any, probably add "what of it?" as they contemplate another article on a subject on which everything has been said already—and much of it by people with considerable experience. In partial self justification for the perpetration of another commentary, the following points are advanced: no one seems to have collected the "literature" on the teaching of anatomy; virtually all writers treat it with a most serious or most condescending style—both of which are annoying; and, lastly, it provides an opportunity to present some features of our own experiment.

Instead of the present title, perhaps "Why Anatomy Teachers Anyhow?" better describes one's feelings after a perusal of more than 200 papers which have been found* to discuss the problem in greater or lesser detail. Possibly, it is improper to approach, in such a spirit of levity, a subject which has been treated so often with the ponderous manner befitting its oft expressed dullness. Or, again, maybe that is what ails the situation—too much seriousness, not of purpose, but of treatment. Whatever may be the explanation, let us view the matter from some of the many angles involved.

Starting out in the usual way with a definition of terms, the dictionaries appear to prefer "the art of dissection" or "the science which treats of the structure of animals or plants." From the point of view which this article proposes to take, the vote on these two concepts is altogether too close. Anatomy has grown to a stature by no means adequately describable by definition. Its history has been long and the methods used in teaching it have by no means progressed commensurately. It is with the development of these methods, not of the science itself, that we are here concerned.

Although at least 18 papers appeared before that date, the Index Medicus lists "teaching" under the heading of "anatomy" for the first time in 1888, referring to a paper[166] by Lockwood who writes, "if by human anatomy is meant a bare account of the physical characters, structure, and relations which compose the human body, I would maintain that such a soulless thing is unworthy of being called a science" (p. 1372). Cleland[53] states that "anatomy" describes a method, a sentiment echoed by Clark[52] forty-four years later. Macalister[173] calls it the "grievous burden of the student—so much to learn and to do." In view of all that has been written, said and thought about what anatomy is, and must be to be worth anything, it is difficult to bring into line the most recent definition by Kuhlenbeck[181]—that "anatomy is, primarily, dissection" (p. 320). As we progress in this discussion, we shall see how very many things have been invoked to help in the resurrection of this science, so often reported as being dead.

*A list, probably incomplete, of the 284 references may be obtained from the author.

The history of anatomy has no place here, except to point out that the earliest teaching methods[219] appear to have involved the reading, or quoting, by the professor, of "authoritative" descriptions—with or without concomitant demonstrations. The method, with too little modification, apparently has survived to this day even in this country where now by far the best anatomical teaching is done. The first instruction in America seems to be undated specifically. Sometime before 1647, there was, according to Waite[270], who quotes from a work by J. Eliot on that date, "made an anatomy for we never had but one Anatomy in the Countrey which Mr. Giles Firmin did make and read upon very well." Since then teaching has improved amazingly but by weird and devious paths, as we shall see.

Obviously, the most important element in the making of early anatomies was the Professor and it might be difficult to prove, in many instances, that he does not think he still is. Of the many references to his activities, a few may be selected at random, and without prejudice, for comment. The fact that most of these happen to be from foreign schools should not give us too much cause for smugness. At Louvain, the Professor is said[113] to oversee and explain the more difficult parts; Bluntschli[30] naively uses the phrase "the Professor permits" to refer to some student activity in the laboratory; at Milan there is a waiting room for the Professor who, by some error, arrives a bit ahead of time for his lecture, and Berry expresses[25] great satisfaction that the members of an "honors" class are to work with the head of the department. How widespread such conditions are in our own country might be difficult to determine without consultation with students, but as late as 1918 Emmel[84] urges that the professor should get into the laboratory. From abroad comes at least one ray of hope when Sieglbauer expresses[238] a desire for sympathetic and non-pompous teachers. This insinuates that the professors' example in self inflation may have been followed by some of their helpers.

Before leaving the subject of how the professor should act, it may be pertinent to discover certain opinions as to what he should be. One of the earlier viewers-with-alarm expressed[215] concern lest the "specialist" be not practical. But the chief worry seems to be whether the holder of a degree other than that of doctor of medicine can possibly do other than fatally mislead the aspiring medical student and thus cause him to waste a large portion of his time. Symmers[255] goes to considerable length to develop that general thesis and draws a swift riposte from Stockard[248]. The latter's point of view is echoed by Henderson whose comment[117] is directed against the Council on Medical Education and Hospitals of the American Medical Association for intimating that only M.D.'s should teach the premedical sciences— to give them the clinical touch. The most recent torch bearer seems to be Cheever, who eloquently defends[47, 48] the super-excellence of the "medical man" as a teacher of the medical sciences. Comparatively, Macklin's[176] parenthetical remark that the "histologist should be medically trained" pales into relative insignificance and provides a definite anticlimax. It does, however, raise the question as to whether the possession of an M.D. degree constitutes a medical training providing carte blanche for the teaching of

anatomy; and its corollary, which inquires if a sufficient medical training cannot be gotten by a properly educated person who has no legal right to flaunt the caduceus. At the moment, it is foreign to our purpose to enter the probably interminable polemic. The enormous quantity of advice published on teaching methods and points of view would seem to make it quite immaterial who does the training—all he would have to do is follow directions, if possible without tying himself into a knot which would give pause to a wounded medusa.

The traditional way to start instruction is with a careful survey of the skeleton. So many examples of this are still extant, that no attempt will be made to mention them individually. An editorial comment[88] quotes Elliot Smith as saying that the osteology class is a "wicked and sterilizing force which is still permitted to waste the student's time and kill his natural interest in the subject of anatomy." What to teach is still unsettled in spite of suggested outlines galore, some of them presented in the "best order[96]" or whether most pertinent to the first or second year course[27]. An attempt[54] has recently been made to arrive at the proper answer as to course content by an analysis of examination questions —concluding from them that "anatomy is largely a descriptive and informative subject" (p. 170) though later suggesting the "feasibility of approach . . . from the standpoint of principles . . . and the futility of mere practical knowledge" (p. 174). While Moorman[192] offers a plea for teaching "the normal body" and Cheever[47] joins others in stating that everything is important, there are many suggestions as to proper methods of presentation.

Leuf[162] ventures to suggest as a proper method the listing of defects and their cures; Roberts[214] modestly comes out with "the best method," while Strasser[250] provides a long treatise on just how to teach, what books to use, etc. Even though only one title[156] refers specifically to didactic teaching, so many papers describe that popular method that only a few of the more spectacular will be quoted. Descriptions of the foreign schools provide the best examples, but many supporters are to be found in America. One of the earliest discussions by Macalister[171] stresses the importance of anatomy as a science, as a help to future work, as a discipline, and winds up with cheers for osteology. Monks[191], in 1885, compared the teaching in America with that in England to the detriment of the former—apparently chiefly because of the relative lack of stress on details. He advises better examinations and more teaching in direct preparation for them. In Vienna, according to Platt[205], writing in the same year, the student must spend some months in the "annex" before starting dissection—learning bones, muscles, organs—meanwhile attending lectures by the university professor. This idea is promoted by many, including Leuf, who enters a plea[162] for teaching (by the telling) of detailed anatomy. He considers it a "disgrace" for demonstrators to be compelled to "read up" in order to make a special demonstration or to answer a question. Dwight[77] informed his students in 1890 that "in the first place of course there are the lectures" (p. 339) and six years later Mall[177] bemoans the fact that "the anatomist patiently keeps up this slow and stupid method of instruction" (p. 86). Keiller[140] believes that the bones must be learned first and that there must be lectures on tomorrow's dissection. This idea is continued

when he still holds, thirty years later[141], to spoon feeding because the students come to him "as babes." Desmarest[71] states that "disséquer avant de savoir l'anatomie est un nonsens" (p. 860) and Hansen[111] seems to agree with him. In some places the obvious grind is lessened by the introduction of a speed differential[78], or by permitting a certain degree of freedom[252], or by giving no formal lectures in gross anatomy, although at least one writer[112] contends that "the aim should be to train each student as if he were to be a specialist in the subject" (p. 183).

The universality of didactic methods has been deplored many times since 1894, when Shiels' wordy and witty article[237] criticized them and in the next breath called for more. Many have been the suggestions[2, 4, 52, 142, 184] that fewer details be taught. Some of these same writers, and others[282, 125, 173], especially the earlier ones, have felt that the establishment of better examinations (practical questions instead of conundrums[173]) was the key to the situation. However, as early as 1888, Lockwood[166] expressed his fears that "we shall never make examinations a test of wisdom or of character" (p. 1372) and would seem to subscribe to Humphrey's contemporary statement[130] "to make anatomy better remembered and a better mental training, it must be made more interesting and more attractive and more thought inspiring" (p. 1030).

From many sides comes the advice to make it more practical. In the earlier writings the idea seems to be that anatomy should be taught as a practical science, by practical men, and for the examinations (how they do creep in)—which should be more practical too—as well as for future use in the practice of medicine. We are told editorially[82] that in the eyes of many the anatomist is regarded as the chief delinquent among those teachers who "seem to forget that they are members of a common team whose sole duty should be the production of efficient medical men" (p. 432). Here, also, we have an enlightening comment on the ubiquitous examination, which reads "without exception all written examinations in anatomy—at least all questions in descriptive anatomy—lead to the accumulation and perpetuation of barren knowledge" (p. 433). Holmes resigned from the Board of Examiners when, in 1893, the examinations in anatomy and physiology were made separate. He deplores[125] the extra "cramming" possibly thus engendered, and cries out that "while we specialize our examinations and break them up into separate bits we shall look in vain for practical teaching" (p. 1215).

Hickey[122], perhaps, exaggerates slightly when he says that "the teaching of human anatomy has passed by many evolutionary steps to its present perfected state" (p. 577). He probably refers to, inasmuch as he commends, the introduction of practical applications to stimulate interest—and thus approach perfection. Eccles[82] wishes to further "the teaching of anatomy in such a manner that the finite mind may obtain and retain those (facts) which are essential. I consider that this requires a good deal of 'heterodoxy' in the relating of anatomy to surgery" (p. 376). Pleas which have been voiced to keep anatomy more or less servile to surgery, medicine and obstetrics are too numerous to mention, many of them thinly disguised with a cloak of so-called practicality. An early call for

"synthetic" anatomy comes from Macdermott[174] and is echoed a quarter of a century later by Callander[42] and by Rogers[218], building up possibly to a method of presenting the real anatomy of the living.

According to Vallery-Radot[266], "le premier cours de démonstration anatomique sue le modèle vivante" (p. 561) was established in 1776 by M. Jean-Josephe Sue. From that excellent beginning, apparently for the benefit of art students only, teachers of medical students may have gotten the idea. The first published account of the systematic use of the living model seems to be that of Keen in 1881[139]. Others[95, 247, 83] advise the use of a model to start, and, with or without it, so-called living anatomy is urged[44, 181]. Along exactly the same line is the so-called X-ray anatomy whose exponents are legion*. The incontrovertible arguments of most of these papers are that not only can otherwise invisible things be seen by use of the X-ray but the anatomy shown by that method is accurate—which cadaver anatomy is not. When and how the X-ray is most useful as a means of instruction is discussed rather fruitlessly by several of the advocates.

Palpation as a means of learning anatomy is thought especially well of by Cooke[62], who cites, in 1893, as an example of tactile "knowledge" of anatomy, his own prowess in tying, with his back turned, the subclavian artery. Lachmann[153] keeps the general idea alive to the present when he trains the sense of touch by having students learn to tell to which side a bone belongs by feeling of it. A suggestion which seems more practical is put forward by Ryerson[222] who urges instruction in methods of physical examination along with instruction in anatomy.

The use of gross sections was urged in a British discussion[1] in 1897 and Jackson[135] emphasized their value in the visualization of relations. The antiquity, as well as the usefulness of the method is pointed out by Brodnax[39] who states that da Vinci had sagittal sections of the body in the 16th century and that Vesalius used sections of the brain.

Sauser[225] provides a short history of the use of modelling in anatomical teaching. As a method it is advocated by some[37, 88, 104, 120] and opposed by others[92] because it takes so much time. One proponent[104] claims it valuable "to reduce the anatomical stumbling block and to render its grasp facile for the learner by means eminently practical" (p. 993).

Other machinery recommended as being useful, essential or the best means of teaching includes drawing apparatus and outline drawings [115, 51], large pictures instead of demonstrations no one can see[160], well preserved cadavers[86], student cards[121] of various sorts and numerous other devices.

Theoretically, all such trappings could be used to teach practical anatomy, living anatomy or anatomy from the various suggested "points of view." Of the latter, approaches via comparative anatomy[6, 131, 182, 262] and its allied sciences, variation and heredity[69, 183], and anthropology[22] are urged by their proponents. The embryological point of view is also urged by some of the above as also by Grant[100] who considers that appreciation of certain principles makes memorizing of relations unnecessary. On the other hand, Cooke[63] immediately deplores

*13, 16, 21, 122, 193, 208, 211, 234, 254, 257 and others.

Macalester's[173] early contention that the various morphological bases are of aid in learning anatomy. He says that they merely confuse the issue, and that if the scientific anatomy is to be superadded it should be done by special teachers. Most writers, however, urge that anatomy be taught as a science instead of as a purely descriptive discipline, many emphasizing its resignation as a full time handmaid of surgery.

Continuing discussion of points of view, the "functional" comes up for special mention in many papers**. Of particular interest are the comments of Loeb[167], who says—"anatomy is a real science if it contributes to the solution of the riddle of life or if it arouses in the student a desire to look for a solution of this riddle. The purely descriptive and technical way of teaching anatomy which is in use today cannot and does not arouse such a desire in the student" (p. 307). His most interesting reflection on the physiological viewpoint in anatomy follows: "the real subject of physiology is the dynamics of protoplasm or the constitution of living matter . . . what today is called medical physiology proper, is in reality mostly anatomical physiology and should be taught by properly trained anatomists" (p. 308).

So many writers have emphasized the need of liberalization in the teaching of anatomy that it is impossible to mention them all but a few may be quoted briefly as an introduction to later comments. It is significant that among the earliest liberals was Mall[177, 178, 180, 181, 182] whose primary interests are obvious from his statement that "the object of the laboratory is to teach students, to train investigators, and to investigate. Although the first mentioned requires the greater portion of the instructor's time, its importance is by no means as great as the second and third[177]" (p. 85). He continues to plead for a discontinuance of lectures, for adoption of a real elective system of teaching, a university type of training, for less regimentation, no whip and no coercion. He urges[180] the fostering of independence, the encouraging of observation and the discouraging of the too great employment of memory. As a step in the right direction, he reports[182] that "we are gradually making our anatomical instruction more and more inductive" (p. 28). Flexner[89] put forth the same excellent advice in the following words: "the teacher of anatomy may take one of two roads. He may attempt to forecast literally the special requirements of each of the above branches (clinical, physiological, pathological, etc), confining his instruction to the indispensably useful thus arrived at; or he may handle his subject freely—not unmindful of its practical value, but with broad scientific background and sympathy. It needs no argument at this point to vindicate the latter policy" (p. 61-62). No argument, indeed, but a very bold and witty defense of liberalization is contained in the paper by Pohlman[207] who voices a final, well justified, note of pessimism in the words, "The advice given in a symposium like this will not materially affect us . . . whose mental . . . habits are too well formed, perhaps, to allow even a moderate elasticity" but he ends on the hopeful note that "rather this recital . . . will do much to steer the younger men toward a more friendly

**4, 34, 52, 142, 155, 161, 231, 236 and others.

personal interest in their respective flocks" (p. 350). Additional, excellent briefs for a modernization program are given by Clark[50], Whitnall[280, 281], Corner[55], Gregersen[103], Sabin[223] and Fletcher[88].

Most of the recent writers stress the importance of research interests in stimulating anatomy teachers to present the subject in some other than the dry as dust, purely descriptive manner. Mall[179, 181, 182] emphasized this correlation particularly with reference to imbuing the student with the "research attitude." In an excellent article, Weed[276] points out that "hand in hand with teaching must go advance of knowledge in the subject . . . it is no longer necessary to argue the importance of research as a functional of a university department" (p. 1).

This teacher training function is also emphasized by others[29, 60, 126, 248], but very often the methods employed are no better for the teacher than for the student. Many dodges have been tried, including that of having the same instructors teach several, or all, of the branches of anatomy covered by the department[60, 212, 240]. In some instances, this plan is facilitated by the establishment of a combined course, such as has been described by Hooker[126, 127], Congdon[58-61], Kampmeier[138] and Hernandez and Brent[119]. However, in at least some of these, the excellent purpose would seem to be impeded by the various restrictions which a highly regimented schedule is bound to impose.

A plea for the establishment of advanced courses for those (few) who may be interested in something besides the "practical" was published by Allen[3] in 1891. This was followed by another from Mall[178, 182] who urged that the elementary work be concentrated in the first year and an elective system established to provide work, beyond the minimum, given by university methods with great freedom as to content and procedure. Various forms of combined courses given in the second year of medical study have been tried[80, 183] but they are somewhat different in content and in purpose than those mentioned above.

Several publications have been devoted almost solely to the teaching of histology since the first by Prudden, in 1879, which was hardly more than a course outline. Somewhat later, Barker and Bardeen[18] urged the use of fresh tissue, thus inaugurating, in 1896, a method still too little employed. Cowdry[68] has many recommendations as to procedure; Macklin[175] stresses the practical aspects, while Sabin[223] pleads the additional usefulness of histology as a stimulator of imagination and curiosity. That these attributes need stimulation is pointed out by Stockard[247] who blames the general school and college systems for their decadence. Histology's borderline status between anatomy and physiology is evidenced by the fact that it is taught by the physiologists in England. In Clark's[52] plea to have it taught by anatomists, one may see either an effort to transplant a descriptive discipline into the department of descriptionists or a realization of the fact that structure is "anatomy" even though it may be displayed in slices. The first interpretation would imply a just commentary on the most widespread method of teaching, the second a compliment to the correlative ability of those who believe in seeing the woods in spite of the trees, but to a certain extent with their help.

The relatively few published comments on the teaching of neurology indicate that it is more or less of a step child even yet. Barker and Keys[19] describe a method of presenting the subject to large classes, Clark[51] states that lectures are an important part of a three weeks' course, Vonderahe[268], and Mettler, Cleckley and Slaughter[187] offer rather detailed plans for its teaching. Not too much is said anywhere of the part it should play in the organization of the department nor that it is primarily an anatomical science. Apparently, in many places, it is frankly neglected.

The subject of student effort has been dinned in our ears at least from the time of von Baer's (1866) pronouncement that scientific education is "best obtained by continued self instruction under guidance" (quoted from Mall[182]) to, perhaps, the most recent, if not original, paraphrasing of deGaris[70] to the effect that anatomy can be learned but not taught. Practically every article emphasizes the importance, and suggests ways and means, of encouraging the student to observe, think, remember and correlate. Some of the ideas are good, many are bad and when tried they work in varying degrees. Mnemonics[45, 190] have been tried and fallen into disrepute, and various advices on how to study touch about the same chord as one long semitheological essay[243] on the building up of knowledge as an inventor would (?) build a machine, starting "where the creator actually began the work of constructing the human mechanism, viz., the centrum of the seventh dorsal vertebra" (p. 4). Launching the student there instead of at the biblical rib, it goes from bad to worse. That, more or less, is everyone's experience when trying to teach a student how to learn.

Periodic, official, inspections, with subsequent reports, have been made under the auspices of the Rockefeller Foundation, the American Association of Anatomists and the American Medical Association. In a 1909 report, Bardeen[12] presents very excellent advice which has, perhaps, been followed too little. For the students is suggested plenty of free time for thought, for elective courses, etc. For the staff, both teaching and research are recommended—the higher staff to give the introductory courses, the junior staff the electives. Concerning the machinery commented on earlier in this paper, Bardeen states that "various methods of instruction will yield good results when employed by capable teachers" (p. 426). The latest report[279] mentions that the highest ranking departments concentrate the work, have 93 hours less for gross anatomy than the lowest ranking, insist on first hand information, do not use lectures in connection with the routine, put four students to a cadaver, favor use of atlases, discourage or forbid use of manuals of dissection, integrate osteology with the dissection, keep laboratories open, use special dissections, x-ray, fluoroscope, correlation patient clinics, living models, fresh and living tissue and otherwise move to liberalize and diversify student activity.

With all this background, how should the teaching activities of an anatomy department be arranged; what should not be done, what should be done, how and by whom? What follows constitutes a report of progress in an experimental attack on the problem, hampered by no traditions and based upon a group experience of some years of really active participation in the teaching program.

So far as pedagogical fundamentals and ends to be attained are concerned, there is nothing that can be added. Everyone realizes that a large part of the task is concerned with making students out of the members of the heterogeneous group which presents itself on registration day. That many teachers have different ideas as to the best way to do this job must be evident from the foregoing. Methods vary all the way from the cruel treatment of throwing a man overboard with not even a straw to buoy him up, to the equally reprehensible practice of stuffing him like a Christmas goose—feet nailed to the block, wings flapping in protest, willy nilly. Fortunately for the students, many schools have arrived at a more or less happy medium so that the consternation is not nearly so great as it might be otherwise, not to say that it is not bad enough at best. That the anatomy departments of the country have at least a two-fold task in student instruction is conceded by everyone who ever was connected with such a department. In addition to introducing the students to some facts and principles of anatomy there is the much more thankless task of orienting them in the so-called scientific method. Most of them have not received, in the years of premedical preparation, a very well defined notion of how to approach a science. They still expect a detailed laboratory manual and someone to lead them by the hand through the intricacies of every problem. They are imbued with the idea that the chief aims of a student are to learn what the teacher wants him to know and not to get too far behind the other members of his class. They still go out of their way to make a good impression and find it very difficult not to make primary the really secondary goal of getting a good grade in the course.

If we are to graduate any but followers of the routine, most of these notions must be combatted. The problem is how to do it and still have the students come through with a fair knowledge of the subject matter. Possibly, the first thing to remember is that each student is a separate problem; no two students are alike nor should they be treated alike. Not for the sake of orderliness and ease of presentation should any two students be required to do the same thing at the same time or in the same way. The proper method for one man may not do at all for the next—and what instructor is so good that he should impose the details of his method on any student? Advise and encourage, yes—but require nothing. Every student should be helped every time he needs help, but not always when he asks for it—at least until he has learned not to ask about obvious things. In other words, not only should anatomy be taught, but so also should the student.

Right here critics will start their protests with outcries that some things have to be done at the same time and that there may be only one possible way to do them. True enough, but that does not in any way excuse the rigid scheduling of everything. The real reason students are not handled individually in many places is that the staff members do not have sufficient real interest in them to be bothered. It is easier to establish an assembly line, based on someone else's blueprints, than to prove one's worth as a scientist by instituting a few minor experiments, modifying instead of discarding them if they fail to work.

Our experiment has been running for eleven years, the details of its conduct

have been changed from time to time but the fundamental plan has continued. It has been maligned by numerous and sundry; its perpetrators have been characterized as crazy, and probably as incompetent—but, singularly enough, it works. The general set-up of the medical education program here facilitates its working because the various departments do not turn in grades to the Dean's office. The intellectual activities of the students in any given subject are indicated on the official records by the terms passed or failed. While open to some objections, the advantages of this system are too manifold and too manifest to require much comment. It does away with the tiresome and inaccurate figuring which accompanies a numerical grading system, and permits a certain latitude of judgment when rating students "good," "bad" and "indifferent,"—which is about as close as anyone can come to it anyhow—and is as close as is needed.

Our preliminary work occupies practically the full schedule of the student for the autumn quarter and two days a week in the winter quarter, a total of 572 hours. Again, the schedule indicates that 132 of these hours are for microscopic and neuroanatomy, the remainder for gross anatomy. However, this does not tell the whole story by any means so far as the student is concerned, and is only somewhat less accurate when applied to the staff. In the first place, each student works when and as he pleases. The laboratories are available for his use at all times—days, nights and Sundays, and he takes advantage of this fact—to work when he feels like it rather than when someone tells him to work. Inasmuch as there is no attempt to keep everyone together, every man can progress with reasonable safety at his own rate of speed—after he learns how. And if, at first, he makes a few errors—what of it? On opening day each self-elected group of from twelve to twenty, according to the number of available instructors, associates itself with a staff member for the fraction of the quarter indicated by the number of student groups. This instructor works with the group both in dissection and in histology (or neurology) for his allotted time, then exchanges groups with another. The students go immediately to the laboratories and work. During the first several days, much time is spent in demonstration and in careful supervision of the various laboratory tasks. Students are shown what use can be made of the textbook, the atlas, the library, the microscope. They are encouraged to be friendly and to get acquainted with each other and with us. Such an arrangement permits the closest possible contact, assures the necessary individual guidance and encouragement, facilitates correlation of the various phases of anatomy and brings the instructor perilously near the verge of exhaustion. With recent staff increases, it has become possible to relieve each instructor three half days per week, in the "heavy quarter," during which he may recuperate—and keep the research kettle simmering. The objection which could be raised, in addition to the wear and tear on the staff, that such rotation of groups causes mental confusion on the part of the students who must accustom themselves to several different staff viewpoints and methods, does not hold. They choose their own course, set their own pace, and like it. In case a topic or problem of general interest comes up, a spontaneous discussion within the group is instituted then and there. This substitute for so many formal lectures has gained great favor and

the better students come to look on lectures as a waste of time, even if they are good lectures, which most of those we have heard, and given, are not.

So far as prosecution of dissection is concerned, each team of two students, working on the same side of the body, is encouraged to organize its own attack, investigate each structure exposed and use the textbooks as consultants rather than as points of departure. In consequence, no two teams necessarily are doing the same thing at the same time, but a variety of regions are exposed. This functions to prevent immediate comparison of dissections, but to postpone it until it provides also a review. No definite schedule is followed, although the frequent oral and written demonstrations provide guides to progress as well as practice exercises. Relatively simple "cases" are distributed frequently for the added purpose of stimulating interest in the so-called practical applications of anatomy. This interest is also fostered by integrated use of the fluoroscope and of X-ray photographs administered by a member of the X-ray department who is also on the anatomy staff. Further, the use of small group conferences has proven a distinct asset. Four students meet weekly with a member of the staff for informal discussion of any phase of the work which may be uppermost in the students' minds. These conferences are best when completely spontaneous but, under certain circumstances, topics for discussion have been selected in advance. Laboratory material may be used at the discretion of the members of the group, but whatever the method, the conference is carefully prevented from degenerating into a quiz.

In the treatment of the microscopic side of the work, emphasis is placed on the description, rather than on the "spotting" of sections, the latter a completely useless though often amusing pastime. A brave fight is put up against the commonly adopted attitude expressed by the question—"what are we supposed to see?" and every encouragement is offered toward individual, careful observation of the material. Fresh tissue, either vitally stained or unstained, is used profusely during the study of almost every organ. At first the students do not like this because they say they cannot see anything, but realization of its value dawns as comparisons are made with the sections of fixed tissue. Oral descriptions by the students are made possible daily and the frequent written descriptions are painstakingly checked against the slide from which they were made. Do we again hear voices protesting against the work thus imposed on the staff?

In neurology, both structure and function are emphasized with the aid of adequate gross material, sections of the brain stem (complete series cut in various planes), demonstrations of selected clinical cases and the free use of problems. The latter are issued periodically and are chosen for their gradually increasing difficulty of solution. All of these things add materially to the students' understanding of neurological problems. The few lectures given are concerned chiefly with the presentation of newer concepts of neurology as shown by recent experimental and surgical studies. Far from being a step-child or a separate "course," the neuronal tissues of the body are integrated with the others as fully and as completely as possible. Completely absent is the tradition, so cherished in many

schools, that neurology is completely bewildering, vague and un-understandable. The students actually like it.

One of the greatest bugbears which all students have to face is the examination. Regardless of native ability, degree of preparation or phase of the moon, mention of a quiz or an examination sends its prospective victims flying into solitary confinement to study for it. And that is where the trouble lies, instead of studying something useful or interesting, they cram isolated facts which they think may be asked—and at least one-half their success depends on their luck. They discard all pretense of intelligence and place all their faith on memory. Whatever mental balance they may have had is abolished, and the result is a supreme dither—which lasts until after the ordeal is over.

This state of affairs wastes a great deal of time and the results obtained are not in any way salutary. In consequence no oral or written demonstration on the part of a student is called an examination or a quiz—and to make it stick, all such exercises are entirely optional. Many of them are given during the work, but unannounced to avoid the cramming sprees. The results are corrected and criticised severely for the benefit of future occasions but no grade or other value is placed on them. Each man is encouraged in the belief that he should learn to present facts in a logical, concise manner, orally and in writing, and that here is an opportunity for practise. Admittedly, some of them do not believe a word of it, but the response has been gratifying, nevertheless, and the absence of examination tension from the atmosphere is sincerely appreciated.

The question will now arise—how then, without examinations is the progress of the student gauged? It is done by careful observation, by working with him in the laboratory, by really getting acquainted. At the end of the "course," the staff discusses each student with considerable care, and if the quality of his work has been satisfactory to the majority he is passed. A unanimous expression of dissatisfaction is necessary to fail him. That the method is not too slipshod is attested by the remarkable agreement, with our judgments, of departments which do use examinations.

To supplement the preliminary period of constantly supervised work, the department offers a general program of electives, all of which are extremely informal. Instead of establishing a series of regular lectures and laboratory courses, the facilities of the department are placed at the disposal of the students at all times. Most of them know what they want to do and are encouraged to go ahead with their plans. The laboratory work is individual, each student doing as much as he wishes to do, correlation being accomplished by frequent demonstrations and conferences between the workers themselves and whichever staff member is in charge of that particular phase of the subject.

We are thoroughly convinced that the general method in use at Duke has distinct advantages. A preliminary course, followed by whatever elective work may be desired, provides a better anatomical background than is secured when beginners are forced through all the details at the start. The spirit of confidence, independence and freedom is appreciated by the students and is not abused by

any one who is worth promoting. Of course, certain of the departments to which the students go after leaving us still say that their students do not know any anatomy, but all anatomists have long since ceased to worry about such a perennial howl. No system of teaching, or of learning, has yet been devised which will fix all details of anatomy in any student's mind so that he can be johnny-on-the-spot in the surgical clinic. The best we can hope to do is to provide a framework on which they can build, and to train their power of reasoning so that they may be equipped to attack the more complicated anatomical problems which they meet.

In the last analysis it makes very little difference what "method of teaching" is used. Under any system, or none at all, the good students will prepare themselves adequately and the poor ones always will be poor. So why not treat entering students like gentlemen from the very beginning; give them the freedom of the place and time to breathe; stop hounding them with recitations, quizzes and final examinations; get to be their friend instead of having them sneak up the other aisle when you "catch them in the movies?" They are not only happier under such a system, but, in the long run, will learn more anatomy and become more deserving of the name "students." Of what actual value to a student is the pompous professor who struts about and demands his quota of so-called respect? Why should men as mature as medical students are supposed to be undergo humiliation at the hands of, or better, under the tongue of, any staff member? Is it not far better to secure a deserved reputation for sanity, common sense, square dealing and humaneness? There is little question about such a method as outlined above being a greater chore for the staff than other more set lecture-laboratory-quiz schemes. It takes all the faculty's time and asks for more, but it does keep everyone from being bored and permits of no coasting down last year's ruts. With five or six dozen men on their toes to learn all they can, each one doing something different, and enjoying life immensely in so doing, the stereotyped, routine loving instructor gets trampled in the rush. And he deserves it.

Study of the Accomplishment of the 1940-1941 Freshman Class of the Medical Schools of the United States and Canada

Thirteenth Study

FRED C. ZAPFFE
Secretary, Association of American Medical Colleges
Chicago, Illinois

The data given in this study are based on the reports sent by the 77 medical colleges of the United States and eight of the ten medical schools in Canada (Laval and Montreal Universities did not participate).

There always has been variation in the numbers of medical students reported. This can easily be explained. At the beginning of the academic year, every medical school sends to the office of the Association of American Medical Colleges an enrolment blank for every medical student matriculating for the first time. For many students who are repeating the year a blank is not made out, but at the end of the year, every student attending is reported on as to his accomplishment and standing. Therefore, more students are included in this report than were reported as having newly matriculated at the beginning of the year. Then, too, quite a number of students drop out within a week or ten days after the beginning of the year, usually because they do not like medicine. They may be represented by an enrolment blank but they are not included in the report made at the end of the year.

At the beginning of the 1940-1941 year, enrolment blanks were received for 5,819 students, but at the end of the year, reports were received for 5,961 students, an increase of 142 students. This is 90 more students than were reported on for the 1939-1940 session.

COLLEGE DATA

The members of the 1940-1941 freshman class came from 557 colleges and universities. Seventy-nine of these colleges were not approved by any accepted approving agency. They contributed 173 students. The Association of American Medical Colleges permits acceptance of students of nonapproved colleges, provided that the university of the state in which the college is situated accepts its students, giving full credit for work done.

The numbers of these students has diminished from year to year, as have the colleges represented by them. Thus, in 1937, 267 students came from 108 nonapproved colleges as against 173 students from 79 colleges in 1940. Lack of data makes it impossible to say whether fewer students are attending nonapproved colleges, i.e., students who intend to enter medical school, or whether selection of students by medical schools is more rigid now than formerly. It is possible that students who intend to study medicine are making inquiry as to whether a

college is or is not approved before they enter. As to more rigid selection, in 1934, 65 per cent of all applicants for admission to medical schools were accepted, whereas in 1940, 53.3 per cent were accepted, the actual number of applicants having remained virtually the same.

Another point bearing on selection is the fact that year by year the number of students accepted who have had less than three years of college work has diminished, and the number holding a bachelor's degree, or better, has increased, although the degree of itself cannot be accepted as an index of better scholarship. Nevertheless, either scholarship has become better or selection has been based on better scholarship than formerly. A basis for passing judgment on this point is the percentage of failures at the end of the medical school year. For instance, in 1936, 13.2 per cent of all freshmen failed; in 1940, only 8.7 per cent failed. Some of these failures appear in the following year as repeaters, about 25 per cent.

ACCOMPLISHMENT OF FRESHMEN

Table 1 summarizes the accomplishment of the 5,961 freshmen students. The class is divided into two groups: "Own," representing those students who attended the medical school of the university in which they prepared for medical work, and "Others," representing the students who attended other medical schools than their own university medical school. There were 2,207 "own" students and 3,754 "other" students, or 37.0 per cent and 63.0 per cent, respectively. One would expect to find that the accomplishment of "own" students is better than that of "other" students because selection of "own" students is far less difficult than selection of "other" students. All the data needed to make a good selection are at hand: the complete record, first hand information from

TABLE 1. ACCOMPLISHMENT OF "OWN" AND "OTHER" STUDENTS AND BOTH GROUPS

Preparation	Own—(2207) 37.0%				Others—(3754) 63.0%				Own & Others—(5961)				Totals	
	Cl. %	Enc. %	Out %	W. %	Cl. %	Enc. %	Out %	W. %	Cl. %	Enc. %	Out %	W. %	No.	%
2 years	91.8	4.1		4.1	66.0	22.0	10.0	2.0	78.9	13.1	5.0	3.0	99	1.6
3 years	83.7	7.7	6.6	2.0	79.0	10.7	7.1	3.2	81.4	9.2	6.8	2.6	1680	28.2
4 years or more	70.0	15.8	12.1	1.6	73.1	15.8	6.4	4.7	71.6	15.8	9.3	3.2	361	6.1
A.B.	79.6	10.8	7.2	2.4	80.0	13.0	5.1	1.9	79.8	11.9	6.2	2.1	2236	37.5
B.S.	79.6	11.5	6.6	2.3	75.5	16.9	6.2	2.3	77.5	14.2	6.4	2.3	1585	26.6
Totals	81.1	9.7	7.1	2.1	78.0	13.8	5.9	2.3	79.1	12.2	6.4	2.3	5961	100.0

No degree—35.9%; degree—64.1%

instructors in the university, the possibility of a personal interview, etc. Nevertheless, selection from this group is rigid because many medical schools accept comparatively few of their own students. In a few instances, the class consists almost entirely of "own" students.

Table 1 shows that the percentage of "own" students with a clear record is greater than that of "other" students, and fewer "own" students had encumbered (subject conditions or failures; incompleted work) records than "other" students had, but more "own" students failed and withdrew (mostly because of failing

scholarship) than did "other" students—which upsets the belief that selection of "own" students was as good as it was thought to be.

However, another important factor enters into the picture, namely the amount of preparation in college by members of both groups. Table 1 shows that only 1.6 per cent (99) of all students had less than three years of college work. In 1939, 2.4 percent (144) students were in this category. The "own" students in this group did decidedly better work than did the "other" students in every way as to clear records. In the three year group the "own" students excelled the "other" students by a slight margin. The "other" students in the four or more years group (no degree) did slightly better than the "own" students. In the A.B. group, they were virtually the same in performance. In the B.S. group, the "own" students did a little better than the "other" students.

In encumbered records, the "own" students made a better showing than did the "other" students. There was a slight difference in failures—"out" and "withdrew." The "other" students had the best of it.

It is also significant that there is a gradual shift toward remaining in college longer than the required minimum of two years. Far fewer students remain only two years; more students take the full course of four years. Whether this trend is the result of a desire to acquire more knowledge, or whether the so-called "premedical" courses call for longer residence in college in order to secure the needed subject credits to meet the minimum requirements of medical colleges, or whether it is felt that there is more assurance of acceptance by a medical college if the applicant holds a bachelor's degree, cannot be stated with any degree of positiveness. It is true that each year more colleges select their students from among those applicants who have a degree, although the published entrance requirements do not demand a degree as absolutely necessary for acceptance.

Comparing the accomplishment of the various groups set up according to degree of preparation, as shown in table 1, it must be admitted that the 2 years group has made a good record, one that compares very favorably with the record of all other groups. Of course, it is more than likely that the selection of students from this group was more rigid than in the case of groups with more than two years of college work. Perhaps, they can be termed a "select" group, hence performed well. It had by far the fewest failures.

The "four or more years" group is rather a heterogeneous one. Some of these students were in college for as long as ten years. Most of them were there for five and six years. In all probability, they went along somewhat aimlessly before they decided that they wanted to study medicine. Whatever the reason for this long stay in college, their record is the poorest in every way. They, too, are represented in the "repeaters" group.

Under the column "Totals" in table 1 are given the number of students in each group and the percentages represented by them. In 1939, 63.8 per cent of freshmen had a degree; in 1940, the percentage was 64.1. It has been increasing year by year.

MULTIPLE DEGREES

It is interesting to know whether students holding more than one degree do better work than do those who have only one degree or no degree at all. Information on this point is given in table 2. There were 163 such students, 2.7 per

TABLE 2. ACCOMPLISHMENT OF STUDENTS HOLDING MULTIPLE DEGREES (163)

	Women					Men					All				
Preparation	Cl.	Enc.	Out	W.	Total	Cl.	Enc.	Out	W.	Total	Cl.	Enc.	Out	W.	Total
A.B., A.M.	9	....	1	....	10	31	1	1	....	33	40	1	2	....	43
A.B., B.S.	1	....	....	....	1	16	1	....	....	17	17	1	....	....	18
A.B., M.S.	2	1	....	....	3	19	5	1	....	25	21	6	1	....	28
A.B., B.S., A.M.	....	1	....	....	1	....	....	....	....	....	....	1	....	....	1
A.B., B.S., M.S.	1	....	....	....	1	....	....	....	....	....	1	....	....	....	1
A.B., A.M., Ph.D.	1	1	....	....	2	5	....	1	....	6	6	1	1	....	8
A.B., M.S., Ph.D.	....	....	....	....	....	....	....	....	1	1	....	....	....	1	1
B.S., M.S.	2	....	....	....	2	26	7	....	3	36	28	7	....	3	38
B.S., M.A.	1	....	....	....	1	11	....	1	....	12	12	....	1	....	13
B.S., M.S., Ph.D.	1	....	....	....	1	8	....	....	....	8	9	....	....	....	9
B.S., M.A., Ph.D.	....	....	....	....	....	2	....	....	1	3	2	....	....	1	3
Totals	(18)	(3)	(1)	....	22	(118)	(14)	(4)	(5)	141	(136)	(17)	(5)	(5)	163
Percentages	81.8	13.6	4.5			83.7	9.9	2.8	3.5		83.4	10.4	3.1	3.1	

2.7% of all students.

cent of all students. In the 1939-1940 class there were also 163 multiple degree holders. The accomplishment of this group was decidedly better in 1940 than it was in the preceding year. Clear records were held by 83.4 per cent (74.2 per cent in 1939); 10.4 per cent had encumbered records (12.3 per cent in 1939); 3.1 per cent failed and 3.1 per cent withdrew (9.2 per cent and 4.3 per cent, respectively in 1939). Taking the group as a whole, it did far better in 1940 than the same group did in 1939. The reason is not apparent from the data at hand.

TABLE 3. ACCOMPLISHMENT OF WOMEN STUDENTS (330)

Preparation	Clear %	Encumbered %	Out %	Withdrew %	Totals No.	Totals %
2 years	100.0				2	0.7
3 years	65.3	13.3	16.0	5.3	49	22.7
4 years	58.3	25.0	8.3	8.3	12	3.6
A.B.	75.7	13.9	8.7	1.7	173	52.4
B.S.	70.6	17.6	11.7		68	20.6
Totals	71.8	14.9	10.9	2.4	330	100.0

No degree, 27.0%; degree, 73.0%.

THE WOMEN STUDENTS

There was a slight increase in the number of women students in 1940, 330 as against 311 in 1939. They do not seem to have done as well as did the men nor did they do as well as the women did in 1939. Their preparation for medicine was better than that of the men. Only 0.7 per cent had less than three years of college work; 73.0 per cent had degrees. No deductions can be drawn from the data on hand. The facts are here but they do not show why the women

students did not do as well this year as they did in 1939. They represented 6.7 per cent of the entire freshman class. Six of them were repeaters. Details are given in table 3.

STUDENTS FROM NONAPPROVED COLLEGES

The data on the accomplishment of students coming from nonapproved colleges are shown in table 4. There were 173 students in this group of whom 11.5 per cent had less than three years of college work; 59.5 per cent held a

TABLE 4. ACCOMPLISHMENT OF STUDENTS (173) FROM UNAPPROVED ARTS COLLEGES

Preparation	Clear %	Encumbered %	Out %	Withdrew %	Totals No.	Totals %
2 years	65.0	10.0	25.0		20	11.5
3 years	81.8	11.4	6.8		44	25.4
4 years	66.6	16.6	16.6		6	3.5
A.B.	59.1	20.4	20.4		44	25.4
B.S.	76.3	8.1	10.2	5.1	59	34.1
Totals	71.6	12.8	13.9	1.7	173	100.0
			15.6			

No degree: 40.5%; degree: 59.5%
Multiple degrees—4. A.B., B.S.—2; A.B., M.S.—1; B.S., M.S.—1. All clear.

degree (A.B., 25.4 per cent; B.S., 34.1 per cent); 4 held two degrees and acquitted themselves well, coming through clear. The accomplishment of the group was not as good as that of the students coming from approved colleges. The percentage of failures (13.9) was particularly high. It is curious that all the withdrawals were by students with a B.S. degree. Yet this group had the lowest percentage of failures (10.2). An unusual happening, one which has never been reported before is the fact that the A.B. group had the second largest

TABLE 5. ACCOMPLISHMENT OF REPEATERS (147)

Preparation	Own (43) Cl. %	Own (43) Enc. %	Own (43) Out %	Own (43) W. %	Others (104) Cl. %	Others (104) Enc. %	Others (104) Out %	Others (104) W. %	All Cl. %	All Enc. %	All Out %	All W. %	Totals No.
2 years	100.0	....	....	....	....	100.0	....	....	50.0	50.0	....	....	2
3 years	85.7	9.5	4.8	....	65.0	15.0	20.0	....	75.6	12.2	12.2	....	41
4 years	50.0	50.0	....	....	80.0	....	....	20.0	61.5	30.8	....	7.6	13
A.B.	80.0	10.0	10.0	....	80.5	14.6	2.4	2.4	80.4	13.7	3.9	1.9	51
B.S.	100.0	....	....	....	67.5	19.0	13.5	....	70.0	17.5	12.5	....	40
Totals	79.1	16.3	4.6	....	72.1	16.4	9.6	1.9	74.1	16.3	8.1	1.4	147

No degree: Own—69.7%; others—25.0%
Degree: Own—30.3%; others—75.0%
Multiple degrees: Own—A.B., M.S., 2—Clear
Others—A.B., B.S., 2; A.B., A.M., 4; A.B., M.S., 1—all clear

percentage of failures—20.4. The less than three years group had 25.0 per cent. Can that fact be accepted as evidence that the courses leading to the B.S. degree are better than those leading to the A.B. degree in nonapproved colleges? These variations give rise to many questions. For example, is it the college, because of

arrangement and setup of courses, responsible or is there a man on the faculty, or even more than one man, who is responsible? In a number of well known instances the shifting of one man from one college to another has been made evident by the accomplishment of the students—not so good and better, respectively.

ACCOMPLISHMENT OF REPEATERS

The repeater is always an interesting problem. Often a student who does badly in one medical school does outstanding work in another. Of course, there are reasons for this, often environmental. In the 1940 class, there were 147 repeaters as against 184 in 1939. Repeaters are finding it increasingly difficult

TABLE 6. ACCOMPLISHMENT OF SOPHOMORES, JUNIORS AND SENIORS

Class	Total No.	Clear %	Encumbered %	Out %	Withdrew %
Sophomores	5378	82.1	14.2	2.8	0.9
Juniors	5026	84.9	13.8	0.8	0.4
Seniors	5086	98.8	0.8	0.1	0.2

to gain admittance to medical schools. Even with a second chance to prove themselves, they do not do as well as nonrepeating students. There were nine multiple degree holders in this group. They all came through clear. An interesting point for this group is that among the "own" repeating students only 30.3 per cent held a degree, whereas among the "other" group, 75.0 per cent held a degree. There were 43 "own" and 104 "other" repeaters. Table 5 shows details for this group.

ACCOMPLISHMENT OF ALL CLASSES

Table 6 presents the data on the accomplishment of sophomores, juniors and seniors. As is to be expected, accomplishment improves as students are promoted. But it is not perfect. Even juniors fail of promotion and seniors fail to graduate. The percentage of encumbered records among sophomores and juniors remains astonishingly high, even higher than among freshmen. Withdrawals are accounted for almost entirely by illness and financial worries.

TABLE 7. DATA ON MATRICULANTS IN ALL CLASSES WHO CONTINUE THEIR STUDIES

Year	Freshmen No.	Sophomores %	Juniors %	Seniors %
1937	5594	86.6	83.9	90.9
1938	5811	91.9	86.5	
1939	5871	91.5		
1940	5961			

MATRICULANTS IN ALL CLASSES

Data on matriculants are given in table 7. If the percentages given are compared with other figures reported previously, there seems to be some disparity, which raises the question—are they accurate? It must be recalled that

every year there are withdrawals and repeaters. Some of the withdrawals return later, the next following year or two, three and more years later. One man came back to complete his medical studies after having been out for twenty years! That is an extreme case but that and other cases alter the numbers of students in each class. The percentage of 90.9 for seniors given for the class which entered medical school in 1937 includes many increments made during the fol-

TABLE 8. ACCOMPLISHMENT OF STUDENTS IN EIGHT MEDICAL SCHOOLS OF CANADA*

	1st Year		2nd Year		3rd Year		4th Year		5th Year		6th Year	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Clear	114	61.6	160	75.0	366	78.9	349	79.1	332	81.5	413	94.0
Encumbered	21	11.3	31	14.5	59	12.7	83	10.9	64	15.7	20	4.5
Failed	48	25.9	19	8.8	31	6.6	2	0.5	7	1.7	4	0.9
Withdrew	2	1.1	4	1.7	9	1.9	6	1.4	4	1.0	2	0.5
Totals	185		214		465		440		407		439	

	No. Students	Clear	Encumbered	Out	Withdrew
Totals	2150	82.6%	12.9%	3.2%	1.3%

*Two schools not reporting (Laval; Montreal).

lowing three years. Analyses made of the graduating class for each year—and published in the JOURNAL OF THE ASSOCIATION OF AMERICAN MEDICAL COLLEGES—gives details with regard to how many students complete their work in four calendar years. Then there is another group which alters figures—the group which completes the four years of academic work in three calendar years. This group is increasing in size year by year. If all these factors are taken into consideration, it can be stated that from 20 to 25 per cent of every entering class does not graduate.

TABLE 9. GRADUATES OF CANADIAN SCHOOLS

			Failed	Con.	Withdrew
McGill	86	(23 from U.S.A.)	1		2 (ill)
Toronto	138		2	1	
Queens	42		2		
Alberta	37		1		
Manitoba	62	(3 repeaters)		1	1
Dalhousie	41	(10 from U.S.A.)			
Laval	65	(6 from U.S.A.)	8		
Western Ontario	30	(6 from U.S.A.)			
Montreal	54	(3 from U.S.A.)			
Totals	555	(48 from U.S.A.)	14	2	3

THE CANADIAN MEDICAL SCHOOLS

Table 8 gives the data on eight of the ten Canadian medical schools. Two schools did not furnish these data. Not all Canadian medical schools are on a strictly four year basis. There is one two year school. One school is on a five year basis. Another is on a six year basis, combining arts and medical work.

Table 9 presents data on the graduates of nine four year Canadian schools—a total of 555. Forty-eight graduates came from the United States. Canadian

schools which formerly accepted residents of the United States no longer do so, therefore, the number of such graduates next year will be considerably less than it has been. For example, Dalhousie at one time had a large number of students from the United States. Several years ago Dalhousie decided not to accept any more nonresidents when it found that most, if not all, were men who had failed of being admitted by one of our own schools.

Careful analysis of the tables presented herewith will disclose many facts not mentioned specifically in the comment. Arts colleges and universities find them very informative and valuable. This fact should be a solace to those medical schools which have contributed so generously of time and labor to make the study possible. I am, personally, grateful to them for giving me this assistance.

"As a Man Thinketh, So Is He"

True happiness and real success
Are matters of the mind;
The happy man is he who can
In *thought* his blessings find.

No matter where a man may fare—
What circumstance present—
A thoughtful mind can always find
Some measure of content.

For from our thought our lives are wrought,
Like chains forged link by link;
Contentment then for thoughtful men
Depends on *what* they think.

And thus through life, despite all strife,
Is happiness enjoyed
If through the past, and while life lasts,
The mind is well employed.

W. D. Wilcox

Medical Education and General Semantics

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Those of us who are interested in teaching medicine and have some realization of the responsibilities involved, are confronted with complex and often baffling problems. Undoubtedly, advances have been made in teaching methods in recent years and constructive attention continues to be directed toward the improvement of medical education. There are certain fundamental difficulties, however, which have not been recognized very generally. My attempt to point out some of these problems is not meant to be in a highly critical vein; I simply wish to indicate our need for help along these lines. A clear understanding of our difficulties should be made known, and advice and help should be sought from any quarter which may offer remedial suggestions.

My thinking on these problems has been stimulated by a series of lectures on General Semantics, which formulates a new branch of natural science concerned with "human evaluations and orientations." It is based on much profound epistemological theory which cannot be entered into within the scope of this paper. In addition to theory, however, General Semantics offers a methodology and working mechanisms which I have found extremely helpful in my own thinking and teaching.

In medicine we are trying to understand and manipulate variations from normal which occur in our bodies. The infinite complexity of the human organism in relationship to its environment leaves us little hope of obtaining more than a fragmentary knowledge of such intricate changes. And if this dynamic state of life is difficult to understand, it is even more difficult to teach.

One of the most serious problems in the teaching of medicine arises from the highly technical terminology which engenders much confusion as to meanings and interpretations. Perhaps it is a somewhat more complicated situation than that found in other scientific fields, for medicine has retained so much from its ancient history and has, in addition, borrowed so liberally from the basic sciences and appropriated terms common to the other professions, without having formulated any coordinating theory or methodology. The problem is more serious than it might at first appear. Dr. Crookshank recognized this in his supplement to Ogden and Richards' *The Meaning of Meaning*[1] when he said, "All teachers and professors of medicine are dependent in the communication of their researches to their fellows and of instruction to their pupils upon the use they make of symbols

1. Crookshank F. G.: "The Importance of a Theory of Signs and a Critique of Language in the Study of Medicine," in The Meaning of Meaning, C. K. Ogden and I. A. Richards; (New York: Harcourt, Brace and Company, 5th ed., 1938), pp. 337-355.

and upon their understanding of the difference between thought and things."

In addition to inadequate terminology, there are linguistic difficulties inherent in conveying knowledge empirically gained to the student, whose capacity for dealing with unfamiliar, highly inferential, terms is decidedly limited. An example of this is encountered in our efforts to teach the quantitative aspects of disease. It is not so difficult for the teacher to express or the student to interpret the qualitative changes which take place in the diseases we are called on to diagnose or treat. But we find a wide variation in the individual inferences generated by the quantitative aspect of our descriptions. For example, we often refer to the subjective symptom of pain in the abdomen. The *quality* of pain is not difficult for anyone to understand; most people have had pains in the abdomen at some time in their lives. But, as soon as we attempt to measure this subjective symptom, we are confronted with difficulties of interpretation. We resort frequently to comparative terms which we hope will offer some clarification—such as "marked pain" or "rather severe pain." Textbooks are filled with descriptive words like "stabbing," "colicky," "knifelike," "boring," "dull," etc. The use of quantitative terms is equally difficult of understanding in application to objective signs and symptoms. References to "cyanosis," "edema," "dyspnea," are frequently encountered. The student can recognize the qualitative aspect of a bluish discoloration of the skin, a puffy accumulation of fluid in the tissues, a shortness of breath; but the quantitative measurement of these conditions, which, after all, is the indication of the seriousness of the disease process, is exceedingly difficult to convey.

Accurate and complete statistical analyses would seem to offer some hope for solution of this perplexing situation, but as yet biometric studies have not proceeded to the point where we are able to reduce any considerable number of our observations to mathematical formulae. Statistical methods are becoming increasingly helpful, but even when dealing with numbers, we must be sure that they have not been manipulated to prove a cherished theory.

The use of definitions has been the very basis of our understanding of health and disease. An indiscriminate dependence on them has given rise to serious misevaluations. Too often medical men have felt that when a disease was given a name or label, then diagnostic problems were taken care of and treatment could accordingly be prescribed. The controversy raging at present around the management of acute cholecystitis illustrates my point. In a general way, acute cholecystitis means active disease of the gallbladder. But from the time the individual first starts out, he has a gall bladder; it begins to show minor changes and finally these may culminate in a crisis or climax which is called "acute cholecystitis." To suggest the safest time for radical treatment of such a changing disease would be rather questionable if one attempted to deal only with a definition. A survey of the literature in medical journals shows that, unfortunately,

many authors have been doing just that. I venture to say that pages on pages of discursive writing would never have been written had the authors observed together the cases about which they wrote. In our larger hospitals it is quite evident that the best trained men will differ less in the therapy used than they will in their interpretations of the descriptive terms applied to similar conditions. Yet, in textbooks and lectures, we continue to rely on definitions which are inevitably subject to a wide variation of individual interpretations. Perhaps it is not to be wondered at that medical students come to "fondly believe" (to use the words of Dr. Crookshank) "that disease 'entities' were discovered by their teachers much as was America by Columbus."

This problem is an inevitable result of old ways of thinking. For at least two thousand years our bodies and their environment have been considered as static and material entities. In the past half century, however, there has been a complete revolution in scientific thinking. In the new approach we are dealing with a dynamic process world.

This orientation must be imparted to the medical student. He must learn to think of disease as life in an unconventional attitude and he must recognize that it is as dynamic as life itself. Disease is a relationship of physicochemical changes. These changes are those of life and they represent energy in action. A disease process is analogous to a moving train. When one sees it in motion, it may be just starting or just stopping or travelling at any intermediate rate of speed. The end of the journey may be a predictable station of recovery or the tangled mass of wreckage stopped short of its normal goal. It is a constantly changing, moving picture; you never see it when it is standing still. Descriptive terms covering all these dynamic changes would have to be so extensive that few could live long enough to describe even the simplest of our ailments. It is evident, therefore, that the gaps which must be filled in by the student are many fold the data which can be supplied by the teacher. The student must have a reliable method of looking for and dealing with new data.

It is my feeling that these unsolved problems have contributed in no small measure to the inadequately prepared students who leave our medical schools. For thirty years I have watched the development of interns and residents in the hospital. I have observed that our old educational methods, based as they are on a static, material orientation and rigid terminology, have resulted very frequently in two types of students, neither of which is adequately equipped. On the one hand, there is the student exemplified by the young surgeon who said to me, "What bothers me is that I have a rich knowledge of surgery, but when I am on a case I use only about five per cent of my knowledge; I use mostly mechanisms, mostly my hands to think with." In other words, he is doing those things which can be done routinely without integrating the knowledge he gained through his "thinking." Just as seriously handicapped is the student who has very unusual

cortical retentive centers. He can remember anything you tell him. He can repeat any number of definitions and so befuddle you that you may think for a time that he is an amazingly brilliant student. But the old Persian proverb describes him well—"He who learns and learns, yet does not what he knows, is like one who plows and plows, yet never sows." For when it comes to throwing this knowledge into action, such a student is lost.

For such serious problems as I have just posed, I could not presume to offer a "cure all" solution. Nevertheless, the very recognition of these difficulties should be the first step toward finding a way out. Moreover, there are trends in medical education today which point in a helpful direction and which may very well be developed further.

The increasing emphasis that is being placed on the preclinical study of the basic sciences is highly encouraging, for these subjects deal with the dynamic process world. Claude Bernard has said, "There is in reality only one general physics, one chemistry and only one mechanics, in which all phenomenal manifestations of nature are included, both those of living bodies as well as those of inanimate ones. In a word, all the phenomena which make their appearance in a living being obey the same laws as those outside of it." The dynamic processes of nature "in the living being and outside of it" are operative both in health and disease. The symptoms of a disease are manifestations of a disordered dynamic process. With a sound foundation in the basic sciences, the student is equipped to understand the disordered processes and thus can evaluate symptoms more properly. More accurate, direct observation is relied on, rather than definitions, labels, terms. In other words, an inductive approach is fostered. Thus a certain measure of predictability in disease may be gained; the lack of mathematical exactness is predicated on the fact that in a dynamic process new factors may greatly disturb the course equation at any time.

As an aid in acquiring the inductive approach, General Semantics offers certain devices, taken directly from mathematical method. For example, the absolute individuality of each patient and each disease process is indicated thus: a certain disease process in Smith_1, may be quite different in Smith_2. The disease process, which may be termed "duodenal ulcer," may be indexed in a similar way. In each patient, a duodenal ulcer will differ somewhat, so that ulcer_1 is not the same as ulcer_2. The labels "Smith" and "ulcer" indicate the general similarities and the indexes denote the undeniable differences in each individual and each disease process. The importance of environmental factors may be introduced thus: If Smith_1 is in the country, we may subindex him as Smith_1^1 and a certain disease process may affect him quite differently than as if he were in the city (Smith_1^2). The time factor, which must always be taken into consideration, is also indexed with a date. A simple, and, perhaps, obvious example would state that Smith_1^{1941} is not at all the same individual

as $Smith_{1}^{1921}$ and a disease he may have had in 1921 will be quite different in 1941, although it may be called by the same name at both times. Thus, while certain general notions about each disease process are kept in mind, identifications, which disregard the individual differences, may be eliminated.

I have referred previously to the fact that in the enumeration of symptoms of a dynamic disease process, it is impossible to say "all" about it. It would not be practical to do so, if it were possible. Furthermore, there is much we do not know, and new factors may enter the picture at any time. The symbol "etc.," which is analogous to the use of "n" in mathematical notation, is a valuable one in this connection. It indicates the infinite possibilities which may be encountered in each situation the student faces. Its habitual use in discussion or thinking about a disease should obviate the error of making absolutistic judgments and thus destroying one's predictability.

Within the scope of this paper, I can do no more than hint at the possibilities of these mechanisms. Actually, they may have a very wide application and can contribute a great deal in the way of flexibility and accuracy to the medical vocabulary. Obviously, these devices will not often be employed verbally. As an aid in training a student to think properly about problems of disease, however, they can be of great value. Their use should help to keep him flexible, alert to new developments and discriminating in his approach toward the problems he faces.

Perhaps, their most important function is in automatically causing the student to stop and "think." In this delay, be it ever so brief, there is time for him to integrate his "thinking" or knowledge centers with his action centers. This is the ideal of education. Huxley said it very neatly when he remarked, "The great end of life is not knowledge, but action."

The Medical Student of Today*

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Mr. President, members of the Faculty, Fellow Students, Friends: We are gathered together today in, perhaps, the momentous period of the world's history. 1,700,000,000 people, four-fifths of the world population, are now at war. The Four Horsemen of the Apocalypse can be heard from the distant corners of the earth. All that these people hold dear—life, liberty and the pursuit of happiness—is in peril, where once peace smiled benignantly on those same lands. The shadow of these events is cast on us, and the end no man knows. People, as John Stuart Mill observed, who are complacent, cowardly, unequal to the exertions necessary to preserve these sacred rights are more or less unfitted for them. This is no time for procrastination, or wishful thinking or complacency. It is a time to face realities and to prepare ourselves for whatever the future may hold in store. Never before in my lifetime has there been so much opportunity for service. Never before has the medical man been so richly endowed with the fruits of science or so hopeful of the achievements to come. We, in America, are blessed by living in a country so richly endowed and so geographically situated that she is inevitably destined to become one of the greatest, if not the greatest on earth. That heritage is not to be despised. No nation producing 100 billion kilowatt hours of energy per year, or work equal to the human power of one-half billion men working eight hours a day, is likely to surrender its supremacy. So never sell America short, no matter what happens in the rest of the world.

What of the medical student? In my brief lifetime, I have learned a few truths. The greatest asset is health. Nothing can take its place. A smooth, efficient human machine, running evenly on all its cylinders, is something devoutly to be wished and, if you have it, to guard it. We fail to realize, often before it is too late, that there is a method of living and a system of life which is conducive to that state. This demands systematic planning of work and recreation and exercise and diet and the avoidance of all those factors which induce or favor disease, as your professor of pathology tries so hard to make clear. The modern student rarely learns to allocate these essentials in their proper places.

The next great asset is to become a master workman. Today we see fear abroad; fear of illness, fear of social security, fear of the future and even fear of fear. There is only one thing that cannot be taken away from you and that is what you store up in your forebrains—the knowledge of your profession. The medical profession is ideally situated as a hedge against inflation; common stocks

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—they are often evanescent; money—it disappears all too quickly; things—they often vanish in thin air, but knowledge, and especially medical knowledge, is a commodity which the world cannot do without. No matter where you are, no matter what form of government, no matter what the future—medicine is an essential commodity because it deals with the only real common denominator which determines the destinies of the world, and that is mankind itself.

These halls, these buildings, this great College are dedicated to the most precious thing on earth—the study of man. You are to be entrusted with the lives of countless men, women and children. Our business is to prepare you for that task. It is too serious, too vitally important to treat lightly. Some of the mistakes you will make in later life, you can trace to your omissions in the class room. You and you alone shall determine whether it will be a good life and a full life.

I have a few suggestions:

1. Have a plan. No mariner ever sailed the seven seas without laying a course. Consider carefully that course. Where do you expect to go? If you have failed to answer that question, you are like a ship without a rudder and you will not know what port you may touch. Lay a course and stick to it—now. The first two years you should master the fundamentals; in the last two years you use those fundamentals. You must learn them and you must master them. How beautifully the pieces of the jig-saw puzzle fit together when the whole course is mastered; how jumbled up and discordant they seem before the pieces are fitted together. You will learn modern medicine. It was my privilege to have as teachers, Widal, who discovered the Widal reaction; Laveran, who discovered the malarial parasite; Roux, one of the assistants of the immortal Pasteur, and a number of those great men who in the latter part of the last century welded some of the links to make the mighty thing called medicine today, but none of them possessed the weapons against disease that you will possess. Modern medicine explores the deepest crevices; instruments will be yours, the vision of which were only imagined a few decades ago.

2. Begin now the student habit. Medicine is rich with adventure, its triumphs have only been achieved through hardship and toil. The impenetrable jungle is giving up its secrets day by day, and, who knows, perhaps some of you may blaze the way. But there is no reading more revealing, no work more fascinating. Some day the spark may jump from a book or a magazine, or a teacher and ignite you and, then, suddenly you realize that you, too, have some of those qualities that made other men great in their chosen fields. Read Alexis Carrel's "Man the Unknown" and Arnold Bennett's "How to Spend Twenty-four Hours a Day."

You never know what you can do until you try. The great French neurologist, Pierre Marie, taught me that lesson. I remember that afternoon, nearly thirty years ago, when he sat down quietly and pointed out that none of us use

the full capacity of our minds. He said so many of the cells were in a state of atrophy from disuse. But nature always responds to an increased demand by providing more muscle and if necessary more brain. If any of your senses were removed today, you would learn to sharpen the others. Nearly every great man I have known has had some physical infirmity or some mental complex to overcome before he could bring his full faculties into play. Do you think that your professors of surgery were such master craftsmen at your age? Ask them how they arrived at their present status. I remember Professor Muller when he was an expert pathologist rather than the magnificent surgeon he is today. I remember Professor Shallow sitting many years at the feet of that matchless professor of surgery, the immortal DaCosta. And so it is with the entire faculty.

4. The world is in a state of flux. Everywhere in the far flung battle lines of human endeavor, new ways are opening up. Research has created new concepts, new ideas, new methods. Medicine today is 1941 medicine, founded on discoveries in every field and all that has gone on before. Chemistry has not hesitated to knock at the very principle of life itself. Physics has not hesitated to shatter the atom. The electron microscope and the spectroscope foreshadow new things. Man is knocking, knocking everywhere. We cannot afford to remain static. We must move on. He who charts his course and will not allow himself to be diverted and uses every energy to reach his goal will rarely fail. Complacency, self-satisfaction, inertia—mean going backward. Energy, dissatisfaction with existing conditions, a ceaseless striving after perfection rewards the toiler with more muscle, more strength to climb.

5. I have found that there are few successes without some failure and few failures without some successes. To one man, failure spells the end of everything, to another it only serves to spur him on to greater effort. I know, because so many times I have been tempted to give up. I remember I had a large book with some 1,400 pages and interminable references to write. One day it dawned on me that it was only writing one page fourteen hundred times and the rest was easy. Few jobs fail to respond to the ceaseless biting off piece by piece. Cunningham's Anatomy looked like a big book, but day by day it became smaller.

6. One California observer took 500 patients without demonstrable organic disease whose complaints were not relieved by ordinary sanatorium or medical treatment and placed them on a generous diet with 750 international units of vitamin B_1 and the B complex and observed them over a period of four years. Eighty-three per cent were better in every way. I would advise every medical student to make sure that he is getting at least 750 international units.

7. Finally, a great school has, first, morale, then, discipline and last, but not least, loyalty. Morale implies self respect and a healthy mind in a healthy body. At Jefferson, we have all the elements conducive to such a state. Your faculty

is no group of theorists, they have all been on the firing line. Her men have been recruited from the veterans of many wars. No group is better fitted to produce practical doctors. Discipline implies respect to constituted authority and a consciousness of the purpose of our work; loitering in the hall ways, putting your feet on the benches in front of you, talking when someone else is talking, residents who sit at the table when the Chief enters, nurses who are careless and noisy, patients who are unkempt, beds poorly made, wards littered with apparatus no longer needed, histories incoherent and illegible, all attest to lack of discipline and when you are a Chief, as you surely will become, you will recognize this. In the absence of the Chief, the resident is literally the subchief and so responsible for discipline and order.

Loyalty is the supreme quality of a healthy college. It is an expression of the underlying devotion to the ideals of the group: Loyalty to Medicine and to Jefferson, loyalty to keep alive the traditions of this great institution. To paraphrase a great British statesman, in his finest hour, we shall fight disease wherever we find it by every means in our power, in the hills, in the country, in the myriad homes of this fair country of ours, we shall fight disease whether it be the frailties of the flesh or the more subtle and insidious diseases of the mind. We shall learn all the methods of organized science to combat disease. We must never flag, never falter, wherever disease raises its angry head, we shall strike, and when forces less apparent, but no less real, poison our minds with propaganda, we shall fight that. To preserve our traditions, to maintain our ideals, to guarantee the liberty which your fair land affords, we cannot falter. As Sir Frederick Leighton once said, "Whatever noble fire is in our hearts, will burn in our work. Whatever purity is ours will chasten and exalt it, for as we are, so our work is." And so I say to you, as soldiers in the greater war against human misery and disease, in the language of the scripture, the harvest is indeed plenteous, but the workers are few. Let us carry on.

The Teaching of Tropical and Parasitic Diseases in Medical Schools of the United States

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At the last meeting of the Association of American Medical Colleges, a committee consisting of the present authors was appointed to render a report on the subject of this paper at the meeting of the Association next October. The committee feels that it is appropriate to present their views on this subject to the Association prior to the next meeting so that the members will be prepared, in general, for the report which the committee will make. In view of the present war situation, and the necessity of preparing medical officers for work in the tropics, the committee's views may also stimulate the introduction of more adequate instruction in tropical and parasitic diseases in the emergency revision of the medical curriculum for the duration of the war.

Tropical diseases, as ordinarily understood, include not only those limited to the tropics but also those having a high incidence in the tropics but a relatively low incidence in temperate climates, so that familiarity with them is difficult to obtain in the temperate zones. Some of these diseases are actually quite prevalent in some temperate regions but often go unrecognized because they are considered tropical diseases and are given insufficient emphasis in the medical curriculum. Medical Parasitology is usually coupled with tropical diseases because of the prevalence of parasitic diseases in the tropics, although some animal parasites, such as *Trichenella,* are more prevalent in temperate zones.

There are several reasons for lack of interest in tropical diseases in the United States in the past. The United States is a large country with a climate ranging from cool temperate to subtropical and with accompanying differences in medical problems. There is a certain provincialism which leads to emphasis on the teaching of subjects of local interest, although students who are graduates from any medical school may practice in widely different areas. This tendency to localization in subject matter has been accentuated by the case method of teaching clinical medicine.

Another reason for lack of interest in tropical diseases is that the United States has had few possessions in the tropics, and the medical services and research in these possessions have been conducted primarily by the Army, Navy and

Public Health Service and by certain of the large Foundations. For this reason there has not been the same stimulus for training in tropical diseases as is found in the European countries having colonies or ambitions in the tropics.

The reasons why the committee feels that more emphasis should be given to the teaching of tropical and parasitic diseases in the undergraduate medical curriculum may be summarized briefly as follows:

1. Certain of these diseases, such as bacillary dysentery, amoebiasis, malaria, hookworm, trichinosis and endemic typhus, are widely prevalent in the United States and may be encountered at some time in almost any community.

2. Immigration has brought many persons infected with these and other tropical diseases into the United States especially into port cities on the Atlantic, Pacific and Gulf coasts and across the Mexican border.

3. Increased travel within the United States and to the Tropics has broken down geographical barriers both between the states and between this country and the Tropics.

4. The rapid development of international highways and airplane routes will further increase the chance of importation of tropical diseases.

5. The present war is taking American physicians to many parts of the world where troops will be exposed to a high prevalence of tropical and parasitic diseases.

6. After the war there will probably be greater opportunities for American physicians to accept positions in the tropics with commercial firms, in government service and under philanthropic agencies.

7. The experience of the British in the first World War indicates that when United States troops return from the Tropics during and after the present war many of them will be suffering from tropical and parasitic diseases in acute or chronic stages. Some individuals will be symptomless carriers, potentially infectious to the civilian population. Both government and civilian physicians will need to be on the alert to diagnose and treat these diseases and to prevent their spread.

It is appropriate at this point to call attention to some of the outstanding contributions which have been made to our knowledge of tropical and parasitic diseases by physicians and scientists of this country. Theobald Smith, in discovering the transmission of Texas cattle fever, was the first to incriminate an arthropod as a vector of a protozoan disease. The work of Walter Reed and Gorgas and their collaborators and of the Rockefeller Foundation on yellow fever has had a profound influence on the development of the American Tropics. Our knowledge of typhus and Rocky Mountain spotted fever is due largely to the work of Ricketts, Zinsser, Wolbach and the staff of the United States Public Health Service. Important contributions have been made by Richard Strong in dysentery, pneumonic plague, trench fever, oroya fever and onchocerchiasis; by Craig in malaria and amoebiasis; by Frederick Russell in dysentery and typhoid; by Vedder in beri-beri and the use of emetine in amoebiasis; by Siler in the

transmission of dengue fever and in the immunology of typhoid; by Cort and his collaborators in hookworm, ascariasis and trematode infections; by Maurice Hall in anthelmintics; by Faust in schistosomiasis, clonorchiasis and amoebiasis; by Taliaferro and his collaborators in immunology to parasitic infections; by George McCoy, Karl Meyer and others in plague; by the Rockefeller Foundation in malaria, hookworm and other diseases. This list could be extended considerably, for there are few tropical or parasitic diseases to the knowledge of which Americans have not made important contributions. This record should serve as a stimulus to medical graduates to continue the noteworthy achievements of their predecessors. It is important to recognize, however, that there are at the present time very few young medical men entering the field of tropical and parasitic diseases. The opportunities for achievement are still present but the encouragement which medical students might receive to enter the field is largely lacking.

The committee feels that it is desirable that all medical students in the United States should receive the following basic training in parasitic and tropical diseases:

PARASITIC DISEASES:

1. A required course, preferably in the second year, occupying from 30 to 90 hours depending on the location of the school in relation to the regions in which most of its graduates will practice. This course should consist of lectures and laboratory exercises on the intestinal protozoa, malaria, the blood flagellates, the important trematodes, cestodes, nematodes and arthropod vectors. Where sufficient hours are provided, spirilla and certain spirochetes which are not taught in bacteriology should be included. Although this course would be concerned, primarily, with developing a familiarity with the parasites themselves, the interest of the students can be increased greatly by a consideration of life cycles, pathology, epidemiology, clinical symptoms, treatment and prevention. The senior author, in teaching a course of this kind, occupying 66 hours, to second year medical students for the past thirteen years, has found that the designation of the course as "Parasitic Diseases" rather than "Parasitology," and the consideration of the broader aspects of the subject rather than the parasites alone, greatly increased the interest of students and encouraged about two-thirds of each class to attend evening sessions covering subjects which there was no time to study in the required course.

2. An elective course in the third or fourth year for the consideration of parasitic diseases for which time is not sufficient in the required course or for students who are interested in more advanced instruction in this field.

TROPICAL DISEASES:

One of two methods can be employed for providing adequate instruction. In the third and fourth years instruction can be given in the course in general medicine, pediatrics or preventive medicine and, where appropriate, in surgery, dermatology, etc., or it can be given as a separate course in tropical medicine. The advantage of the former method is that it does not divorce the subject from

the more general subjects of which it is a part. The disadvantage is that it is likely to be neglected unless it is recognized as a definite part of those courses. The second method is preferable only where a separate department or section of the teaching staff is recognized as responsible for tropical diseases. In either case, the Committee feels that the instruction should consist of comprehensive lectures or clinics in which the following diseases are considered: yellow fever, dengue fever, the rickettsial diseases, relapsing fever, leptospirosis, plague, cholera, the dysenteries, sprue, leprosy, malaria and its control, and heat stroke and heat prostration. To these a number of other subjects will be added in schools devoting greater attention to tropical medicine. Among these may be mentioned yaws, tropical skin diseases and nutrition in the Tropics. When cases of protozoan and helminth diseases are available they should also be used for clinical instruction.

For students who are especially interested in tropical diseases, a splendid opportunity has existed for practical experience after the third year of study, at the Schools of Tropical Medicine in Puerto Rico and Cuba. Six weeks or more spent at such an institution, consisting of intramural instruction and field observation, has proved to be of great interest and value to the students who have taken advantage of it under the tutelage of Professor LeBlanc of Cincinnati, in Puerto Rico, and under the auspices of Cornell University in Cuba. Although these opportunities will be interrupted by the telescoping of the medical curriculum during the war, it is to be hoped that they will be made available to students from all medical schools when the war is ended.

TABLE 1.—TEACHING OF PARASITIC AND TROPICAL DISEASES IN 65 MEDICAL SCHOOLS OF THE UNITED STATES

Parasitic Diseases		Indefinite in another course	Number of clock hours						Total Schools
		None		1-20	21-40				
					21-29	30-40	41-60	61-80	80+	
Required	4 year schools	9	8	10	6	9	11	4	1	58
	2 year schools	3	1	0	1	0	1	1	0	7
Elective	4 year schools	52	0	4	0	2	0	0	0	58
Tropical Medicine										
Required	4 year schools	38	5	11	0	2	2	0	0	58
Elective	4 year schools	53	0	2	0	0	0	0	3	58

In reply to a questionnaire recently sent to the medical schools of the country asking for information as to teaching personnel with special training in parasitic and tropical diseases and the amount of instruction given in these subjects, replies have been received from 65 schools. A complete analysis of the replies will be included in the final report of the Committee, but a brief summary may be given at the present time. With reference to personnel equipped to give adequate instruction in parasitic and tropical diseases, it is obvious from the replies that some schools are better staffed than the amount of teaching in these subjects would indicate. An analysis of the amount of instruction given is shown in table 1. This table shows that among the 58 four year schools from which replies

were received, 9 give no specific instruction in parasitology, 8 devote an unstated amount of time to it in another course, usually clinical pathology or bacteriology, while 10 schools devote from one to twenty hours to the subject, and 7 devote from twenty-one to twenty-nine hours to it. Among the 7 two year schools reporting, 3 do not give any instruction in parasitology and one other gives an indefinite amount of time in another course. Thus, in the opinion of the Committee, a total of 37 of the 65 schools reporting, or 55 per cent, devote an inadequate amount of required time to this teaching. Only 6 of the four year schools offer elective courses in parasitology, and 4 of these devote less than 30 hours to the course.

The instruction in tropical medicine, as shown in table 1 is, as one would expect, much less extensive than that in parasitology. Of the 58 four year schools, 38 stated that no required course is given as a distinct subject, and 4 others stated that an indefinite amount of time is given to the subject in other courses. An additional 14 schools stated that specific courses of varying duration are given. Elective courses in tropical medicine were reported from only 4 schools. Of the 3 schools reporting extensive courses, one is given locally and two were described as summer courses given at the Puerto Rico School of Tropical Medicine. It is recognized, of course, that some of the diseases ordinarily classed as tropical, such as bacillary dysentery, amoebic dysentery, and possibly hookworm and malaria, receive attention at most schools in the clinical instruction in general medicine, pediatrics or preventive medicine, and in a few schools other tropical diseases are dealt with adequately. On the whole, however, it is apparent that, at the present time, relatively few medical students graduate with sufficient comprehension and knowledge of these diseases so that they can approach them with any degree of familiarity.

The teaching staff required for conducting adequate instruction in parasitic and tropical diseases depends, of course, on the amount of instruction to be given and the size of the student body. A physician who has had special training in both parasitic and other tropical diseases can be responsible for the instruction if sufficient assistance is provided for supervising laboratory work. Such a physician is particularly valuable in presenting the pathological and clinical aspects of parasitic diseases. If a non-medical parasitologist is responsible for the course in parasitic diseases, he either should have had sufficient contact with the medical and preventive aspects of the subject to include them in his teaching or he should be supplemented by a physician who has had such experience. The instruction in other tropical diseases should, of course, be conducted by a physician who has had postgraduate instruction in tropical medicine or practical experience in the Tropics, or who has sufficient interest to prepare himself for a satisfactory presentation of the subject. A number of medical schools already have instructors suitably equipped for conducting all or part of the teaching which has been advocated, and where expansion of the instruction is desirable in these schools no additional training of personnel would be required. The number of graduate students of animal parasitology has increased greatly during the past decade and

it is probable that any medical school desiring to add a parasitologist to its staff can find a suitable candidate in one of the universities which give graduate degrees in this field. There is also a considerable number of physicians in the United States at the present time who have seen service in the Tropics and who are equipped to conduct instruction. The Committee will be glad to cooperate with any institutions which desire assistance in obtaining such personnel.

A further possibility exists for obtaining postgraduate instruction and experience for members of medical staffs who might be selected to teach these subjects. Tulane University offers a graduate course in tropical medicine and medical parasitology occupying four and one-half months, beginning each September. The Schools of Tropical Medicine at San Juan, Puerto Rico and Havana, Cuba, also offer courses of somewhat similar scope. It has been possible to obtain from some of the philanthropic Foundations, travel fellowships for qualified persons to study tropical medicine at first hand in Puerto Rico and elsewhere, and it is possible that such fellowships can be obtained in the future.

In conclusion, one can enumerate the following advantages which are to be gained by improving the instruction in parasitic and tropical diseases in the medical curriculum. It would broaden the outlook of the student on the whole field of medicine. It would prepare students to be on the lookout for these diseases during their internships and in practice. It would encourage specialization and research in these fields. Ultimately, and particularly in the reconstruction period after the war, it might contribute not only to the protection of the United States from the importation of diseases which war and rapid methods of transportation tend to spread, but it might also contribute to the development of health and prosperity in the Tropics.

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The Accelerated Program

A special called meeting of the Association of American Medical Colleges was held in Chicago, February, 14, 1942. All but one of the member colleges situated in the United States were represented. Representatives were also present from Procurement and Assignment Service for Physicians, Dentists and Veterinarians; the United States Office of Education Wartime Commission; the Association of American Colleges; the Federation of State Medical Boards; the American Hospital Association and the Catholic Hospital Association.

The discussions centered on the many problems arising out of the war and their effect on medical colleges. Outstanding were: acceleration of the medical curriculum by elimination of long vacations but without any lowering of present standards of medical education, and financial help for those students who because of the accelerated program will be unable to work during vacation periods—which will be very short in duration—in order to earn money to help to finance them during the succeeding academic year.

It was pointed out and stressed that while acceleration is desirable in order to increase the supply of physicians for government service within a three year period, no school should attempt to accelerate unless there is certainty that it can do so without lowering standards of medical education. It must be able to receive students who can meet all admission requirements hitherto exacted; it must have an adequate teaching personnel, facilities and equipment and it must not condense, curtail or abbreviate any course of instruction. The curriculum must remain as it is now. Acceleration means only that vacation periods be shortened—especially the long summer vacation—but not to a degree which will not give the student sufficient surcease from study since that may seriously endanger his health.

Then, too, there is the possibility that some students cannot go on an accelerated program. If all medical schools adopt that program, such students will, for the next two or three years—perhaps even for longer—have great difficulty to enter on and continue the study of medicine. Therefore, it may be advisable for some schools—perhaps schools which are not fully prepared to go on an accelerated program—to remain on the present four year plan in order to give opportunity for study to these students.

It was stated, further, that the accelerated program shall consist of at least four full sessions of not less than 32 weeks' duration each, and that at least 35 months elapse between the time of matriculation and graduation. Matriculation was interpreted to mean when the student begins study in the medical school. The Federation of State Medical Boards—which approved of acceleration on the basis stated above—adopted a resolution which calls for a period of 36 months from the beginning of instruction in the medical school and graduation.

As an aid to students who will need financial assistance, conferences have been held with the U. S. Office of Education Wartime Commission—which until now has largely been interested in engineering education—with the view of securing from the government through this commission loans, bearing interest, for students who are on the accelerated program. Who shall receive a loan, and the amount of the loan, will be determined by the dean of each medical school. His action is to be final. It is believed that

the sum of money asked for, $3,500,000, will be sufficient to meet student needs.

The Association reiterated the stand taken at the Richmond meeting, in 1941, that no requests be made for the deferment of premedical students for more than 12 months preceding enrolment in a medical school.

The American Hospital Association and the Catholic Hospital Association announced that there will be sufficient opportunity for entering on an internship by all students who will come through the accelerated program. It was recommended by the Executive Council of the Association of American Medical Colleges, and the recommendation was adopted by the Association, that the length of the internship be not reduced below 12 months at this time. The hospital associations agreed that there is no need for any reduction. Assurance was also given by the Association of American Colleges that an accelerated program of instruction will be adopted by a sufficient number of colleges and universities to overcome a possible shortage of medical students.

It is impossible to state at this time how many medical colleges will go on an accelerated program, but present indications are that the number will be large; that very few colleges will not accelerate. Because of weighty legal complications, some schools will not be able to accelerate despite the fact that they are otherwise in a position to accelerate. On the whole, there was unanimity of opinion that acceleration is desirable but only if it can be done without any lowering of existing standards of medical education, especially the admission requirements, to ensure the high quality of graduates which has resulted for many years.

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College and University War Problems

The Executive Committee of the Ninth Corps Area Commission on College and University War Problems held a special meeting at Stanford University, December 29, to plan means by which colleges and universities of the Western Area might make their greatest contributions toward victory and the national welfare. The committee, representing the majority of the institutions of higher learning in eight western states, passed unanimously a number of resolutions from which the following are excerpted.

1. That colleges and universities in the Western Area immediately place the academic year on a continuous-session or year-round basis so that students will be able to complete the major portion of their college education before they become eligible for Selective Service.

2. That colleges and universities arrange their programs so that students can be inducted into college work immediately on the completion of their high-school course.

3. That colleges and universities review in detail their courses of study and arrange them so that they will make their maximum contribution to the Nation's war program.

4. That colleges and universities make every effort to arrange their programs so that most of the students can complete college work by the time they reach their twentieth birthday or shortly thereafter.

5. That colleges and universities urge Governmental authorities to continue the policy of having local draft boards give most serious consideration to individual occupational deferment of students in courses listed as necessary to the national defense.

6. That in order to keep Government officials informed, colleges and universities draw up a list of equipment and laboratory supplies which they must have if they are to do their utmost in developing technically trained men who are urgently needed in the winning of the War.

7. That colleges and universities urge some form of government support for students—probably in the form of scholarships—in order that those with the proper aptitudes and interests be directed into training for the highly technical occupations in which they are now so urgently needed.

Entrance Credentials of the 1941 Freshman Class

Seventy-seven medical schools have filed enrolment blanks in the office of the Association of American Medical Colleges for 6,244 freshman students. In the preceding year, 5,860 blanks were filed, an increase of 384. For the 1941 year, the University of Tennessee will file blanks for entrants in two quarters and Minnesota will file blanks for entrants in January. This will probably increase the 1941 total by about 80, making a total of 6,324 students.

The total number of freshmen reported on at the end of the academic year 1941-1941 was 5,961, fifty-six more than were reported at the beginning of the year. This difference is accounted for by the fact that not all colleges send enrolment for repeaters or late matriculants. If this happens for the year 1941-1942, the total of freshman students will be about 6,400, the largest class since 1934 when almost 6,700 freshmen were in attendance in these colleges. Accurate figures cannot be given until after the close of the 1941-1942 year.

Of the 6,244 students represented by enrolment blanks, only 89 (1.3 per cent) had less than three years of college work. They were accepted by 10 medical schools. Three years or more (but less than four years) is the record of 2,085 students (33.4 per cent); four or more years (no degree), 297 students (4.8 per cent); A.B. degree (some multiple degrees), 2,223 students (35.6 per cent); B.S. degree (some multiple degrees), 1,550 students (24.9 per cent). Multiple degrees (two or more) are held by 141 students, 3.7 per cent of all students holding a degree.

The total percentage of students holding degrees is 60.4. In 1940-1941, 64.1 per cent had a degree. There are 347 women (330 in 1940) and 107 repeaters (147 in 1940). It is probable that there are more repeaters who were not reported as first time matriculants. Reports to be made at the end of the academic year will show how many there actually are enrolled in the freshman class. Repeaters in other classes are not included in this count.

Of the 77 colleges reporting, 61 increased their enrolment; 10 enrolled fewer students; 6 made no change.

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Volunteer Physician Defense Workers

The Office of Civilian Defense has prepared insignia for volunteer civilian defense workers to wear after they have been enrolled and trained. There is one basic insigne bearing the initials "CD" in red, enclosed in a white triangle superimposed on a blue field, which is to be worn on cap and uniform collar ornaments of all civilian defense workers. Each of the fifteen activities has a distinctive design to be worn on white armbands or embroidered on the left sleeve of uniforms 1 inch below the shoulder seams. The designs have been patented by the OCD, and only enrolled civilian defense workers are entitled to wear them as part of uniforms or to any clothing that would simulate official wear. Workers or their defense councils will pay for the insignia with the possible exception of the armbands. Congress has been asked to authorize funds to distribute the latter.

Physicians and nurses serving in emergency medical field units will be identified by a red caduceus in a white triangle set in a blue circle. In the event of a war emergency such as an air raid, the problem of caring for the sick and injured will be handled by the Emergency Medical Service. Field units composed of doctors, nurses and nursing auxiliaries will set up casualty stations near the site of disaster for the purpose of giving assistance to the injured and expediting their transport to a hospital when necessary. Teams of doctors, nurses and assistants will be dispatched from this station to establish advanced first aid posts closer to the scene of the emergency.

United States Defense Savings Program

The President has set the goal for production of war goods during 1942: 60,000 planes, 45,000 tanks, 20,000 anti-aircraft guns, and 8,000,000 tons of ships. Management and Labor have accepted the challenge; they can and will deliver these tools of war.

All Americans must face the tremendous task of meeting the bill. No matter how great is the demand on our professional service, we must take our part in the civilian battle on the fiscal front. We must provide money, the sinews of war.

We suffered the viciousness of inflation during the First World War, and now we look toward the ideal of paying as we go. But even increased taxes will not pay the costs. We will have to borrow a part of the money from banks and other lending organizations. But, in large part, the Government seeks to borrow directly from the people. The Treasury Department asks that the necessary dollars be loaned to the Government through the Defense Savings Bonds Program.

This philosophy behind the Defense Savings Program is a democratic philosophy. The purchase of each bond represents the buyer's faith in the United States. In return, he receives a security representing his partnership in our Nation. In addition, the bonds represent personal financial reserves that will provide future security for the investor.

Three series of Defense Bonds are being offered, known as E, F and G. Each is designed to meet special needs of purchasers.

The Series E Bonds are the "People's Bonds." These may be bought only by individuals, and can be obtained at any post office and almost any bank. The People's Bonds are appreciation bonds which cost 75 per cent of their face value and the Government pays back the full face value amounts at the end of ten years. The smallest Series E Bond costs $18.75 and pays $25 at maturity; the largest costs $750 and pays $1000. The 33⅓% increase is equivalent to an annual return of 2.9 per cent, compounded semiannually. The bonds may be registered in the names of one or two persons or in the name of one person with a second listed as beneficiary. To protect the buyer of a bond, it is made so that he cannot sell it or use it as security for a loan, but he may redeem it any time after 60 days from the date of issue.

To buy a Series E Bond on the installment plan, one can purchase Defense Savings Stamps. Stamps can be purchased for as little as 10 cents and when $18.75 has been invested in them, they can be turned in for one of the registered interest bearing bonds.

The F and G Bonds are largely for associations, corporations and other large investors. The Bonds of Series F are purchased for 74 per cent of their face value, and at the end of the 12 year maturity period provide a return equivalent to an annual interest rate of 2.53 per cent, compounded semiannually. The new small denomination Series F Bond of $25 costs $18.50; the largest bond of this series is the $10,000 Bond which costs $7,400.

Series G Bonds are intended for those who wish to receive a current income from their investment. Their cost is the same as their face value, and they are issued in denominations from $100 to $10,000. These bonds mature 12 years from the date of issue, and interest is payable semiannually at the rate of 2.5 per cent. Although bonds of Series F and G are issued only by Federal Reserve Banks and the Treasury Department, commercial banks generally will handle applications for them.

Millions of Americans are buying Defense Bonds and Stamps. But, for final Victory, each of us must buy, and keep on buying to the limit of our resources.

College News

Yale University
School of Medicine

Yale will operate the year round for the duration of the national emergency. The course will thus be shortened from four to three years, and each year will comprise four terms of 11 weeks. Tuition for the full course will remain unchanged at $2,000. Because of the reduction in time for elective work, the thesis requirement will be waived for classes graduating in 1943 and thereafter under the three-year plan, but the thesis will be continued as an elective. Provision has been made to increase the enrolment of each entering class from 50 to 60. The summer term will begin June 29, 1942.

A grant of $10,000 has been received from The Carnegie Corporation of New York, in support of the research program of The Clinic of Child Development. The Clinic, which was founded in 1911 by Dr. Arnold Gesell, its present director, is investigating the mental growth of normal infants and devising clinical methods for the early diagnosis of developmental defects and deviations. Staffed by pediatricians and psychologists, it maintains a diagnostic and advisory service for infants and preschool children, a guidance nursery, photographic research library, and special facilities for one way vision observation and for systematic studies of normal and abnormal child behavior.

The methods of the Clinic have been widely adopted in the fields of parent education, child guidance, the regulation of child adoption and in pediatric medicine. Appraisal of infants is made prior to adoption to determine their developmental potentialities. Norms of development have been codified in "An Atlas of Infant Behavior" with 3,200 action photographs which depict progressive stages of mental growth. A recent volume on "Developmental Diagnosis" formulates, for the medical profession, procedures and practical applications in the clinical protection of child development. The current research program includes studies of the early growth of personality and personality defects in infants and young children.

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Wayne University
College of Medicine

Reviews of 100 books of popular or professional medical interest published during 1940 have been prepared by Dr. William J. Stapleton, associate dean. Under the title, "100 Books for the Doctor," they appeared in two issues of the Wayne County Medical Society's *Detroit Medical News.*

"Natural Immunity to Diphtheria," a paper based upon a study of diphtheria incidence among children in a State institution, has won for George D. Cummings, a senior student, the annual Walter J. Wilson award. Named after the late Walter J. Wilson I, who was a staff member of the college, the award is presented annually to the Wayne student whose paper based upon original research is adjudged the best for the year.

Dr. Grover C. Penberthy, of the clinical staff, has been named the new chairman of the Wayne County Medical Mobilization Committee, charged with providing medical aid to Detroit in the briefest possible time in the event of a major catastrophe.

Educational facilities were provided throughout the summer months to enable a group of seniors to graduate this February, four months earlier than originally scheduled.

Several special projects are under way at the College as an outgrowth of the defense program. (1) Through the activities of the medical library staff, an index of military medicine covering the period from 1939 to date has been compiled. This index has been microfilmed

by the Army Medical Library for military use. (2) The department of surgery has undertaken two investigative programs in collaboration with the Office of Scientific Research and Development at Washington. One is a study of "Shock" and the other of "Bacteriological Aspects of Wound Infections." (3) Faculty members have served on induction and selective service boards.

Dr. Robert Mayo Tenery, who last year was a research fellow in the department of surgery, has been named the first recipient of the Dr. Angus McLean Award for Research, to be presented annually by the Wayne University chapter of Nu Sigma Nu, national medicine fraternity.

The award, provided by the widow of the late Board of Education member whose name it bears, is presented to a person who does outstanding graduate research during a given school year. Dr. Tenery did his work during 1940-41 on blood changes from excessive burns. Since leaving Wayne last spring he has become a resident and fellow in surgery at the Presbyterian Hospital in New York City.

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College of
Medical Evangelists

Construction is progressing according to schedule on a new men's residence hall on the Loma Linda campus. The ground breaking exercises were held October 2. Professor Frederick Griggs, chairman of the Board of Trustees, delivered a brief address.

Officers of the Eleventh U. S. Naval District and the Ninth Corps Area of the U. S. Army have met with the junior and senior students from time to time urging qualified men to join the navy or army medical reserves. From forty to fifty students have joined or are in the process of joining. Of the 1,450 alumni of the School of Medicine, approximately 175 are now serving in the armed forces.

During the fall quarter students had the privilege of hearing special lectures by the following visitors in Los Angeles: Dr. Carl F. Meyer, director of the Hooper Foundation, San Francisco; Dr. C. E. A. Winslow, head of the Department of Public Health, Yale University School of Medicine; Dr. Jacob Frostig, lecturer and associate in psychiatry, University of California School of Medicine; and Paul D. White, lecturer in medicine, Harvard University School of Medicine.

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University of Texas
Medical Branch

Recently enacted legislation provides an appropriation of $500,000 to construct a state cancer hospital. It is expected that the hospital will be at Galveston and operated in conjunction with the University of Texas School of Medicine.

A bronze plaque has been hung in the main building of the School in memory of the late Dr. Meyer Bodansky, who at the time of his death in June was professor of pathologic chemistry at the university. He had been a member of the faculty since 1919.

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University of Tennessee
College of Medicine

Dr. Kendall B. Corbin, associate professor of anatomy, histology and embryology, has been appointed chief of the division of anatomy, histology and embryology and acting head of the department of anatomy to succeed the late Dr. August H. Wittenborg.

Tennessee's new psychiatric program —special medical treatment for the mentally ill — has received a $45,000 grant from the Rockefeller Foundation to be spent during the next five years, beginning July 1. The money will be used to assist in providing properly-trained personnel for the psychiatric hospital now being constructed in Memphis. The $410,000 hospital will be completed by next summer.

Dr. Theron S. Hill will direct the psychiatric program. Dr. Hill, now doing research at the University of California, will assume his duties March 1.

Establishment of the psychiatric hospital was made possible by the cooperation of the State Department of Institutions, the John Gaston Hospital of Memphis, and the College of Medicine.

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Hahnemann Medical College

A Department of Public Health and Preventive Medicine has been added, under the direction of Dr. Grant O. Favorite, who has done postgraduate work with Doctor Zinsser, of Harvard.

Dr. T. Cunliffe Barnes has been added to the teaching staff in the department of pharmacology. He is doing research work.

A section of parasitology and tropical medicine has been set up in the department of gastroenterology, under Dr. D. DeRivas, formerly of the University of Pennsylvania Graduate School of Medicine.

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McGill University
Faculty of Medicine

Dr. G. Lyman Duff, head of the department of pathology, has been appointed curator of the Royal Canadian Army Medical Corps medical museum. He succeeds the late Dr. Maude Abbott.

Dr. J. F. McIntosh, secretary of the faculty, has been appointed the university's representative on the Medical Council of Canada, the licensing body for the Dominion. He succeeds Dr. A. Grant Fleming former dean of the faculty.

Dr. J. C. Meakins, dean of the Faculty of Medicine, has been appointed acting principal of McGill during the absence of Principal James in Great Britain where he will consult with the Committee on Rehabilitation after the War.

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Long Island
College of Medicine

The Adam M. Miller Memorial Lecture was delivered January 16th by Dr. Eliot Round Clark, professor of anatomy in the School of Medicine of the University of Pennsylvania. Dr. Clark's subject was: "The Behavior of Cells and Tissues in the Living Mammal as Observed Through the Microscope."

A meeting of the Research Society of the Long Island College of Medicine was held January 14, 1942. The program included "Mechanisms of Survival in Chronic Kidney Disease," by Dr. Jean R. Oliver, department of pathology; and "The Pathogenesis, Course and Ultimate Outcome of Chronic Thyroiditis" by Dr. Emil Goetsch, department of surgery.

A Symposium on Syphilis and Dermatology was held February 6, 1942, under the auspices of the Long Island College of Medicine; The Bureau of Social Hygiene, and the Red Hook-Gowanus Health Center of the Department of Health of the City of New York. The following papers were read:

"Cutaneous Manifestations of Syphilis," by Dr. M. Silverman, instructor in dermatology and syphilis, Long Island College of Medicine and Chief of Clinic, Red Hook-Gowanus Health Center; "Neurosyphilis: Some Clinical and Pathological Aspects," by Dr. Lewis D. Stevenson, associate professor of clinical medicine and neurology, New York Hospital, and associate professor of neuropathology, Cornell University Medical College; "Interstitial Keratitis," by Dr. Thurman B. Givan, clinical professor of pediatrics, Long Island College of Medicine; "The Use of Physical Therapy in Dermatology," by Dr. Anthony C. Cipollaro, assistant attending dermatologist and syphilologist, New York Post Graduate Hospital, and associate in dermatology and syphilology, New York Post Graduate Medical School; "Diseases of the Skin Due to Animal Parasites," by Dr. Howard Fox, emeritus professor of dermatology and syphilology, New York University College of Medicine; "Eczema and Its Treatment," by Dr. Marion B. Sulzberger, assistant clinical professor of dermatology and syphilology, New York Post Graduate Medical School.

Papers read at two meetings of the Research Society of the Long Island

College of Medicine were the following:

"Some Considerations of Human Constitution in Relation to Disease," by Dr. George Draper, associate professor of clinical medicine, College of Physicians and Surgeons, Columbia University; "The Discovery and Significance of the Lymphatics," by Dr. Cecil K. Drinker, professor of physiology and Dean of the School of Public Health, Harvard University.

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Woman's Medical College

The College is giving a course in pathology for physicians who are preparing for the specialty board examinations in obstetrics and gynecology. The course began January 27th and will end May 12th—2 hours weekly, Tuesday, from 3 to 5 p.m. Fee: $25. Applications should be made to the Dean's office.

A course on "Medical Aspects of Chemical Warfare" is being given by Professor Ben King Harned weekly for the rest of the year.

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Duke University
School of Medicine

An electron microscope has been installed and put into operation in the laboratories of the division of experimental surgery. This 1,500 pound machine develops 60,000 volts to magnify an object 25,000 to 100,000 times. It was built by RCA in Camden, N. J.

Dr. R. W. Graves, assistant professor of neurology, has been appointed as one of the Army Consultants on meningitis. Dr. J. M. Ruffin, associate professor of medicine, has been appointed as one of the Army Consultants on Tropical Medicine.

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Stanford University
School of Medicine

Stanford University Hospitals opened a new Lying-In Suite for the Department of Obstetrics and Gynecology on Saturday, January 31, 1942. This suite of rooms puts all labor, delivery and preparation rooms in one unit, contains five labor rooms, three delivery rooms, one preparation room, two small rooms, dressing and rest rooms for doctors, one for nurses and one room for expectant fathers. It is an addition to the present hospital and cost approximately $50,000.

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University of Virginia
Department of Medicine

Following the close of the current nine-months session, the Medical School will change to a twelve months basis; work will be conducted the year round for the duration of the national emergency. The session 1942-1943 will open June 29th, and will comprise four quarters of eleven weeks each. No radical changes are contemplated in the current curriculum, except that electives will be discontinued and a substitute course will be organized in essentials of military medicine, comprising traumatic surgery, first aid, blood plasma banks, neuropsychiatry, preventive medicine and aviation medicine.

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New York University
College of Medicine

Through the generosity of Mr. Lucius N. Littauer, the medical college has recently received a gift amounting to almost a quarter million dollars. The gift will be used to establish "The Lucius N. Littauer Fund" and the income will be expended for research in psychiatry, neurology and related fields. A fair yet liberal part of the income is to be devoted to fellowships for graduates in medicine of superior ability, to be known as Littauer Fellows, to be trained to practice psychiatry and those branches of medical science concerned with the activities of the mind and factors influencing it, thereby recruiting physicians specially devoted to the conservation and restoration of mental health.

An additional gift of $40,000 has been provided for the department of psychiatry by the will of the late Dr. Menas S. Gregory who for many years was professor of psychiatry at the medical college.

Ohio State University
College of Medicine

Due to the present war emergency, the college has cancelled its Ninth Annual Post-Collegiate Assembly, previously scheduled for March 5, 6 and 7, 1942. The Faculty believes it should render every service to the program of medical military and civilian defense and will cooperate, in an educational way, with the Ohio State Council of Defense and other war to victory efforts.

Dean Hardy A. Kemp has been called to service by the Army Medical Corps. He will be an instructor in tropical diseases in the Army Medical School in Washington. Dr. Leslie L. Bigelow will serve as acting dean during Dr. Kemp's absence.

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Tulane University
School of Medicine

Dean M. E. Lapham has been called to duty by the medical department of the U. S. Navy. He is attached to the New Orleans area.

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Loyola University
School of Medicine

Dr. George F. Forster, assistant chief of the Division of Laboratories in the Illinois Department of Public Health, has been appointed associate professor of bacteriology in Loyola University School of Medicine.

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Tufts College Medical School

Two gifts totaling $50,000 have been announced. The Bingham Associates Fund, Bethel, Maine, gave $25,000, and the trustees of a trust for charitable purposes created by William Bingham 2nd of Bethel gave the other $25,000. The gifts were designated for the building fund of the school and bring the total to $500,000 in its current campaign for $750,000.

Dr. A. Warren Stearns, dean has been called to active service by the U. S. Navy.

Bowman Gray
School of Medicine

The establishment of a department of neurosurgery was announced in December. Dr. Henry G. Schwartz, instructor in clinical neurologic surgery and instructor in neuroanatomy, Washington University School of Medicine, St. Louis, has been appointed to head the new department, effective in July.

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University of Maryland
School of Medicine

Dr. Maurice C. Pincoffs, professor of medicine, delivered the Henry Sewall Memorial Lecture, February 3, in the Denison Memorial Auditorium, Denver, during the annual meeting of the Medical Society of the City and County of Denver. His subject was "Epidural Abscess."

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Jefferson Medical College

The Thomas Drake Martinez Cardeza chair of clinical medicine and hematology has been established at Jefferson with Dr. Harold Walter Jones, associate professor of medicine, as the first incumbent. The funds were provided by Thomas Drake Martinez Cardeza to carry on the work of the Charlotte Drake Cardeza Foundation for the study and investigation of diseases of the blood and allied conditions. Mr. and Mrs. Cardeza established the foundation in 1938 and have since maintained it in memory of the former's mother. Dr. Jones will continue teaching in the college and direct all activities of the foundation.

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Western Reserve University
School of Medicine

Dr. Eduardo Braun-Menéndez, lecturer in physiology and director of cardiovascular investigations, Faculty of Medical Sciences, University of Buenos Aires, delivered the forty-seventh Hanna Lecture. His subject was "The Humoral Mechanism of Renal Hypertension."

General News

Buenos Aires Physician Chosen Herzstein Lecturer

Dr. Eduardo Braun-Menéndez, lecturer in physiology and director of cardiovascular investigations, Institute of Physiology of the University of Buenos Aires Faculty of Medical Sciences, has been chosen to deliver the Herzstein Lectures this year. The lectures are delivered on alternate years under the direction of the University of California Medical School and Stanford University School of Medicine, San Francisco. This year they will be given at the University of California, extension division auditorium, March 9-13. Dr. Braun-Menéndez's topic will be "Experimental Renal Hypertension." The Herzstein lectures were established in 1929 under provision of the will of the late Dr. Morris Herzstein of San Francisco.

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Walter L. Niles Fellowship

A fellowship honoring Walter Lindsay Niles, Dean of Cornell University Medical College and Attending Physician at the New York Hospital, who died December 22, 1941, has been announced by the two institutions. An endowment fund of $100,000, of which more than one-fourth has been pledged in advance, is being raised by friends and colleagues of Dr. Niles to provide annual awards to outstanding young men entering the medical profession. The committee directing the effort includes Dr. Bruce Webster, chairman, Mrs. Roger W. Straus, Walter C. Teagle, Neal Dow Becker, William H. Jackson, president of The Society of the New York Hospital; Dr. Edmund E. Day, president of Cornell University and Dr. Malcolm Goodridge, president of the New York Academy of Medicine.

As a result of changes in medical education to help meet the nation's war time requirements for doctors, there is an urgent need for support in the form of scholarships and fellowships, the announcement said, and the Walter L. Niles Fellowship is intended to help meet this need.

In addition to his service as Dean and attending physician for many years, Dr. Niles was a member of the Joint Administrative Board controlling the affairs of Cornell University Medical College and the New York Hospital, which are associated in the medical center on East 68th Street. At the time of his death he was Acting Dean of the College, having returned to this office during the leave of absence of Dean William S. Ladd.

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White Battalions

Armies march across the screen in the opering scenes of the new sound motion picture sponsored by the American College of Surgeons, but they are armies of mercy, "White Battalions—Serving All Mankind." Several hospitals helped in the making of this picture.

A cast of professional motion picture artists was selected for the leading parts in this drama of hospital service. An ideal atmospheric background has been purposefully built to illustrate, for the benefit of hospital people, the effect of considerate manner and sympathetic tones of voice upon the morale of the patient and family. At the same time an impression is conveyed to the public of the individualized treatment that patients receive in modern approved hospitals. The reference to the Blue Cross service plans indicates their value to the public.

Patsy, a rich little girl, and Michael, a poor little boy, are the living, lovable objects upon which the hospital demonstrates its effectiveness. An automobile crash on the way from a party brings Patsy there; infantile paralysis is responsible for Michael's presence.

The audience identifies itself with the anxious parents and through their eyes views the massing of forces to restore Patsy and Michael to normal unimpaired vigor and with them rejoices in the outcome.

When Patsy's father asks, "Isn't there

something we can do to assure every poor child the same care Patsy got?" and the doctor and administrator, in reply, take the parents on a tour of the hospital to show what is being done and how an unrestricted endowment would help most, there is developed understanding of the integrated functioning of the standardized hospital and what that means for the patient.

The film was made possible through a grant from the Becton Dickinson Foundation for the Extension of Scientific Knowledge. The picture is on 16 or 35 millimeter film, is two reels in length and takes about twenty-five minutes for showing.

"White Battalions" is available through the American College of Surgeons at no expense other than carrying charges.

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Industrial Medicine

The American Association of Industrial Physicians and Surgeons, and the American Industrial Hygiene Association will hold their joint Annual Convention in Cincinnati, April 13 to 17, 1942. A program is in preparation in which important medical and hygienic problems associated with the present huge task of American industry will be presented and discussed in clinics, lectures, symposia and scientific exhibits. The central purpose of the meeting will be to provide a five day institute for the interchange and dissemination of information on new problems as well as for the consideration of up-to-date methods of dealing with those that are well known. The industrial physicians have taken responsibility for the program of the first two and one-half days and the hygienists for the remainder of the five days.

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Physicians Needed in the Panama Canal Zone

Physicians are urgently needed at the Panama Canal. The U. S. Civil Service Commission has just announced an examination to secure physicians for these important positions. The entrance salary is $4,000 a year, and free transportation by boat or plane is furnished from port of embarkation, the salary beginning on the date of departure from the United States. Applications will be accepted by the Commission in Washington, D. C., until further notice. There is no written test.

Applicants must have been graduated from a Class A medical school with a degree of M.D. subsequent to May 1, 1920, and, in addition, must have had at least 1 year of experience in a hospital since graduation. Graduates from schools which require the completion of the internship before granting the M.D. degree (five-year schools) will be regarded as having met the hospital experience requirement. Applicants must not have passed their fiftieth birthday; however, because of the arduous duties in the tropical climate, applicants between 25 and 35 years of age are preferred.

Applicants must be in sound physical health; they must be active and capable of arduous work. Although appointees are required to pass a thorough medical examination, the physical requirements are not as high as for the army or navy service.

The duties of the position are to serve as District Physician in a small Government dispensary; have general supervision over all medical and surgical activities in the dispensary; operate a general medical and surgical clinic; examine persons entering The Panama Canal Service; visit patients day or night in their homes and on board ship; and to be in charge of business activities of the dispensary.

Further information is given in the announcements which may be obtained, with application forms, at any first- or second-class post office, or from the U.S. Civil Service Commission, Washington, D. C.

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House Officers Wanted

The Mercy Hospital, Cedar Rapids, Iowa, seeks house officers to take the place of interns. Remuneration is $75 per month with maintenance. This is a fully approved hospital, 125 beds and an outpatient department. Address Dr. J. J. Murphy, 603 Third Ave., S. E., Cedar Rapids, Iowa.

Book News

The Doctors Mayo

By Helen Clapesattle. University of Minnesota Press, Minneapolis. 1941. Price, $3.75.

The Doctors Mayo is an extraordinary book about three extraordinary men, the fascinating picture of a hundred years of medical progress, life on the American frontier as seen by a doctor on the job, and the revelation of how a small-town practice grew into an international institution.

The whole world beat a path to their door . . . Here at last is the full, rich story of a partnership of blood, brains, and work unique even in America. Together these men did big things, but everything they did they shared, not only among themselves but with the world. Dr. Will, Dr. Charlie, and their families actually lived on a common pocketbook!

This book is important to America because throughout the absorbing story of the Mayos' achievement is intertwined much of a century of medicine and surgery. The Mayos contributed to this advance in medical practice, but their way of life, their demonstration of cooperative individualism—Americans working together and with others for the benefit of all—was their real triumph, and America's.

This story had to be told sometime, but modesty and professional reservations kept the Mayos from ever telling it themselves. They authorized its writing and publication through the University of Minnesota Press. H. B. Clapesattle, historian and editor of the Press, is the author. Five years in preparation, The Doctors Mayo emerges as one of the great biographies of American life.

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Textbook of Neuroanatomy

By Albert Kuntz, M.D., Professor of Micro-Anatomy, St. Louis University School of Medicine. ed. 3. Lea & Febiger, Philadelphia. 1942. Price, $6.

The author has reduced to a minimum the difficulties which the student encounters in the study of the anatomy and physiology of the nervous system. The anatomical data are correlated with the fundamental structural plan of the vertebrate nervous system. Structure and function of the parts of the nervous system in man are treated in the light of present day knowledge of their phylogenetic, anatomical and physiological relationships.

The early chapters discuss the nervous system as a whole; then the simpler reflex and correlation mechanisms in the spinal cord and brain stem, including the long conduction pathways. The latter are treated from the points of view of their anatomical relationships and their specific functions. The anatomy of the several divisions of the brain is described simply but adequately. The functional relationships of these parts, particularly the cerebellum, diencephalon, corpus striatum and cerebral cortex, are treated more extensively and more adequately than in the previous edition, in the light of the more recent experimental and clinical studies. The autonomic nervous system is covered in a separate chapter and an outline for laboratory study is included. Most of the chapters are accompanied by references to current literature and a list of general references is appended at the end of the text.

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Encephalitis: A Clinical Study

By Josephine B. Neal, M.D., Associate Director, Bureau of Laboratories, Department of Health, New York; Clinical Professor of Neurology, College of Physicians and Surgeons, Columbia University, and Collaborators. Foreword by Dr. Hubert S. Howe. Grune & Stratton, New York. 1942.

This research was made possible by a grant from the William J. Matheson Commission for Encephalitis Research. The book brings the knowledge of encephalitis up to date. All phases of the subject are covered fully and clearly.

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Clinical Hematology

By Maxwell M. Wintrobe, M.D., Associate in Medicine, Johns Hopkins University School of Medicine. Lea & Febiger, Philadelphia. 1942. Price, $10.

This work brings together the accumulated information in the field in systematic and orderly form. It describes the new methods which are of practical value and it outlines details of differential diagnosis. It makes clear the underlying physiological disturbances and describes the indications for and methods of treatment. It is complete, comprehensive, authoritative and practical.

This work places emphasis on the importance of accurate diagnosis as a prerequisite to efficacious treatment. It describes in detail the effective employment of these and other therapeutic agents. Laboratory procedures, which can be carried out in the office of the average physician, are considered in detail.

Laboratory Diagnosis of Protozoan Diseases

By Charles F. Craig, M.D., Emeritus Professor of Tropical Medicine, Tulane University of Louisiana School of Medicine. Lea & Febiger, Philadelphia. 1942. Price, $4.50.

This work is a manual of laboratory methods to be employed in the diagnosis of diseases caused by protozoan organisms. The author's experience covers forty years of intensive work in this field. He has assembled many valuable procedures which have hitherto been hidden in the pages of medical journals, and which have never reached textbooks on clinical diagnosis or texts on bacteriology and parasitology. Even when they have appeared, they have been covered so briefly as to make their interpretation and application extremely difficult.

The author has included all methods that have a real claim to value in the diagnosis of protozoan disease. To them he has added his evaluation of their usefulness as judged from his own experience and that of others. The "Critique of Diagnostic Methods" which follows each section suggests a scheme for a diagnostic procedure based on his own wide experience. Here is a book which should be of real value to physicians who conduct their own clinical laboratories, to public health officers and to laboratory technicians everywhere, upon whom falls the responsibility of preparing material necessary for the accurate diagnosis of protozoan diseases.

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Symptom Diagnosis: Regional and General

By Wallace M. Yater, M.D., Professor of Medicine and Director of the Department of Medicine, Georgetown University School of Medicine. ed. 4. D. Appleton-Century Company, New York. 1942. Price, $10.

The object of this book is: conciseness, completeness, arrangement and authenticity. These the author has attained in good style.

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Textbook of Embryology

By Harvey E. Jordan, Ph.D., and James E. Kindred, Ph.D., Professors of Anatomy in the University of Virginia. ed. 4. D. Appleton-Century Company, New York. 1942. Price, $6.75.

A complete revision of an excellent student textbook. A distinctive feature of this edition is the incorporation of the more significant among the large mass of recent experimental and comparative embryological data. Literature references have been removed from the text and entered as footnotes and collected in an alphabetically arranged bibliography at the end of the book. New illustrations have been added and old ones eliminated.

Neuroanatomy

By Fred A. Mettler, M.D., Professor of Anatomy, University of Georgia School of Medicine. The C. V. Mosby Company, St. Louis. 1942.

This book is intended to meet the needs of the medical student beginning to receive instruction in neuroanatomy and to prepare him for subsequent clinical training. The text is divided into parts. Part I deals with the topography and morphology of the central neural system as seen with the naked eye. Part II, the microscopic section, deals with the establishment of a sound and usable functional viewpoint. The organization of the text is progressive. Special attention is given to terminology. The book is profusely but well illustrated. The bibliography, covering about 54 pages, is good but hardly of service to the medical student who concerns himself but little with bibliography.

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Handbook of Ocular Therapeutics

By Sanford R. Gifford, M.D., Professor of Ophthalmology, Northwestern University Medical School. ed. 3. Lea & Febiger, Philadelphia. 1942. Price, $4.

In spite of the fact that the text has been expanded greatly, it is still a concise guide to treatment. Statements based on insufficient evidence have been omitted, and only such methods are included as have been shown to be of definite value in the author's experience or in that of other reliable authorities. Progress in the treatment of ocular diseases has been rapid and has made the former edition of this work quite obsolete. Statements concerning the vitamins which were true in 1937 appear absurd today. The use of thiamine chloride in toxic amblyopia, of riboflavin in certain corneal diseases due to deficiency and other advances in our knowledge of nutrition have required a complete rewriting of this section. Sulfanilamide and its derivatives, not mentioned in the previous edition, have so proven their value as to require a full discussion of their rationale, dosage and specific indications. Studies of the sympathomimetic and para-sympathomimetic drugs have given fuller understanding of their mode of action. This subject is discussed fully in its theoretical and practical aspects, with consideration of newer drugs such as mecholyl, prostigmine and furfuryl trimethyl ammonium iodide.

There have been important advances in physical and irradiation therapy, including contact irradiation for retinocytoma and the use of beta-emanations in tuberculosis of the anterior segment. The book has been brought up to date on these subjects. Discussion of certain agents which have been superseded by more effective ones has been eliminated and that of others condensed. New illustrations have been added as required.

Nasal Sinuses: An Anatomic and Clinical Consideration

By O. E. Van Alyea, M.D., Assistant Professor of Otorhinolaryngology, University of Illinois College of Medicine. The Williams & Wilkins Company, Baltimore. 1942. Price, $6.50.

No effort is made to cover all phases of sinus diseases. Subjects most likely to be of interest are considered. Little space is given to malignancies, unusual conditions or rare diseases.

Clear descriptions and numerous illustrations help to visualize the intricate structures and to anticipate their normal variations. The author correlates anatomy and histopathology with the clinical picture of sinus disease. He presents a complete and practical guide to diagnosis and such treatment as promises quick and lasting results.

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Food and Beverage Analyses

By Milton A. Bridges, M.D., Late Assistant Clinical Professor of Medicine and Lecturer in Therapeutics, New York Post-Graduate Medical School, and Marjorie R. Mattice, M.S., Assistant Professor of Pathological Chemistry, ed. 2. Lea & Febiger, Philadelphia. 1942. Price, $4.

The chief objective of this work is to provide analytical data on the largest possible number of food factors. An abundance of new and valuable material has been added and includes the introduction of new tables on other food factors. These new data include tables on the acidity of foods, their fiber content, the occurrence of sulfur, bromine, calcium, oxalate, phytins, purins, available carbohydrates, and ionizable iron. The reaction of foods is covered by a table of pH values which embodies all the common and many uncommon foods. There is a table of organic acids in fruits, vegetables and a few miscellaneous items. Extensive information is given on the acid-ash and alkaline-ash factors.

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Anatomy of the Nervous System

By Olof Larsell, Ph.D., Professor of Anatomy, University of Oregon Medical School. D. Appleton-Century Company, New York. 1942. Price, $6.50.

The subject is presented from the developmental and functional point of view, including a comprehensive account of structure with enough physiology to give functional significance to the anatomical features described. The book is intended primarily for medical students. Each major division of the nervous system is considered in an individual chapter. Gross anatomy is treated briefly. The main emphasis is on microscopic structure and internal arrangement of the nervous elements and the functional significance of the parts described. Brief summaries of illustrative lesions are given at the ends of a number of chapters. Many tabular summaries and a large number of illustrations, some in colors, and a well selected bibliography add much to the value of this work.

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The Blook Bank and the Technique and Therapeutics of Transfusions

By Robert A. Kilduffe, M.D., Director of Laboratories, Atlantic City Hospital, and Michael DeBakey, M.D., Assistant Professor of Surgery, School of Medicine, Tulane University of Louisiana. The C. V. Mosby Company, St. Louis. 1942.

Complete coverage of the subject with a most extensive bibliography presented at the end of each chapter. He who is interested in blood transfusion will find here every bit of information available. Several hundred fine illustrations add to the value of the book.

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Essentials of Prescription Writing

By Cary Eggleston, M.D., Associate Professor of Clinical Medicine, Cornell University Medical College. ed. 7. W. B. Saunders Company, Philadelphia. 1942. Price, $1.50.

Succinct yet sufficient. Every medical student will do well to have a copy of this helpful book—and carry it in his pocket ready for instant use at all times.